Chapter 3. Affected Environment

3.A. Introduction

This chapter describes the current conditions of resources within the S-CNF that could potentially be affected by the Proposed Action, the other two action alternatives (Alternatives 1 and 2), and the No Action Alternative. The following discussions focus on those aspects of the physical, biological, and human environments most likely to be affected by the proposed S-CNF Noxious Weed Management Program, especially by the increased use of herbicides. Resource summaries presented in this chapter are not intended to be comprehensive, encyclopedic catalogues of all conditions on the S-CNF, but rather to focus on characterizing those aspects of the environment potentially at greatest risk from implementing the proposed project. This level of description and the subsequent assessment of environmental consequences in *Chapter 4, Environmental Consequences,* of this Final EIS are consistent with CEQ guidelines for implementing the provisions of NEPA. S-CNF resources that are unlikely to be affected by the proposed project are either not described or are only briefly described in this chapter.

3.B. Project Area Setting

The S-CNF comprises a stunning visual variety of mountain, valley, and shrubland areas. The S-CNF is internationally known for recreational opportunities like whitewater rafting, fishing, and hunting. It includes the traditional homelands of the Lemhi Shoshone Tribe. Lewis and Clark's 1804-1806 expedition traversed the Continental Divide within S-CNF boundaries and the area's rich history includes Idaho's "gold rush." Economically, timber, mining, ranching, and agriculture in the area's bottomlands have maintained the area's viability for more than 100 years. The S-CNF provides diverse habitats for a wide range of wildlife and plant species and for anadromous and resident fish species. Its watersheds provide essential habitat for a number of endangered, threatened, and sensitive species of flora and fauna. Pristine air quality and the adjacent FCRONRW add to the importance of the area.

3.B.1. Climate

The climate of the S-CNF is strongly influenced by oceanic storms from the west, and the drier desert climate to the east. Precipitation comes primarily in the form of winter snows and spring rains, and occasional summer thunderstorms. Winters are generally cold and snowy. Relatively moist spring weather gives way to hot, dry summer and fall conditions with a moderately long growing season at lower elevations and a relatively short growing season at higher elevations. The area's narrow valleys and steep mountainsides result in a widely diverse climate and temperature variations. Annual precipitation ranges from as low as 10 inches in the lower foothills to 25 to 30 inches in the low ridges, to as high as 50 inches in the upper headlands and peaks. Drought has been common (15 percent of the years between 1895 and the present were drought years) in the recorded past (Quigley and

Arbelbide 1997). Consequently, the area is routinely characterized as dry forest, despite some high seasonal moisture.

3.B.2. Geography

The S-CNF is located in Central Idaho, and extends from the eastern borders of the FCRONRW to the Montana border, and south to the volcanic deserts of the Snake River Plain. The Salmon River, a major tributary of the Snake River and ultimately the Columbia River, rises in the southern S-CNF, and much of the upper river is under S-CNF management. Prime population centers include Mackay, Challis, and Salmon. Elevations range from more than 11,300 feet in the Lemhi Range to less than 2,800 feet along the Salmon River. Idaho's highest peak, Mt. Borah, is located in the Lost River Mountain Range of the S-CNF and has an elevation of 12,662 feet.

3.C. Biological Resources

3.C.1. Vegetation Resources and Noxious Weeds

a. Noxious Weeds

1) Species Composition, Abundance, and Extent. Information on the species composition, abundance, and extent of noxious weeds known to occur on the S-CNF was introduced in *Chapter 1, Purpose and Need,* and *Chapter 2, Alternatives,* of this Final EIS. Tables 1-1 and 2-1 list the common and scientific names of the 23 potential, 15 new, and 9 established weed species that presently occur on or may reach the S-CNF in the foreseeable future. Table 2-1 also summarizes, by S-CNF Ranger District, the locations of known established and new weed populations. Appendix B presents detailed information on the number of acres of known weed infestations on the S-CNF by weed species, size of infestation, and location (Ranger District and HUCs 4 and 5). These data reflect the findings of the most recent (2001) inventories. As more inventories are completed, the number of infestations and acres will likely increase.

Table 3-1 summarizes the number of weed species, estimated acres, and number of sites of known weed infestations by Ranger District on the S-CNF, excluding the FCRONRW. Documented, inventoried infestations of the 15 new and nine established weed species on the S-CNF now exceed 66,000 acres at more than 2,500 sites. Most of these infestations vary from less than 1 acre up to 25 acres in size, with extensive populations of spotted knapweed present on the northern part of the S-CNF. Map 3-1 (back of chapter) depicts inventoried noxious weed infestations on the S-CNF. Maps 3-2 through 3-8 (back of chapter) depict inventoried noxious weed infestations within each of the seven S-CNF Ranger Districts.

The North Fork Ranger District contains the greatest number of weed species (16) and acres of weed infestations (54,638) among the seven S-CNF Ranger Districts, followed by the Salmon-Cobalt Ranger District (13 species; 8,182 acres) (Table 3-1). Weed infestations on these two Ranger Districts together comprise approximately 94 percent of all measured noxious weed infestations on the S-CNF. Each of the five other Ranger Districts contains considerably fewer weed species and acres of weed infestations. On the Challis, Leadore, Lost River, and Yankee Fork Ranger Districts, numbers of weed species range from four (Yankee Fork) to eight (Lost River), while acres of weed infestations range from 409 (Yankee

Fork) to 1,627 (Leadore) (Table 3-1). The Middle Fork Ranger District within the S-CNF contains 25 acres of spotted knapweed (Table 3-1).

Table 3-1 also lists the three most abundant weed species (acres of infestations) within each S-CNF Ranger District. They are represented by a total of seven species, and include spotted knapweed, musk thistle, Canada thistle, bull thistle, leafy spurge, yellow toadflax, and sulphur cinquefoil. The three most abundant weed species within each Ranger District dominate that Ranger District's weed communities, collectively accounting for approximately 88 percent of all weed infestations on the Lost River Ranger District; 95 percent on the Leadore Ranger District; 99 percent on the Challis, North Fork, Salmon-Cobalt, and Yankee Fork Ranger Districts; and 100 percent on the Middle Fork Ranger District (Table 3-1).

Spotted knapweed is the most abundant weed species on all but the Lost River Ranger District (leafy spurge) and the Yankee Fork Ranger District (Canada thistle). Spotted knapweed infestations on the S-CNF total nearly 64,000 acres and comprise approximately 96 percent of the total weed infestations. Musk thistle and bull thistle are among the three most abundant weed species in several Ranger Districts but are never the most abundant weed species. Yellow toadflax and sulphur cinquefoil are among the three most abundant weed species in single Ranger Districts, but they cover small acreages compared to the other dominant weed species (Table 3-1).

Table 3-2 lists the species and acres of noxious weeds inventoried just outside the S-CNF boundaries that are associated with the S-CNF Ranger Districts. The presence of these weeds was documented as part of the overall database compilation for the proposed Noxious Weed Management Program on the S-CNF. Gathering near-Forest data such as these contributes to the cooperative weed management programs involving the Forest Service and neighboring counties like Custer County and Lemhi County, and is integral to the overall success of weed management on and near the S-CNF. Map 3-1 depicts weed infestations inventoried just outside the S-CNF that are listed in Table 3-2, as well as inventoried weed infestations on the S-CNF that are listed in Table 3-1. As more inventories are completed, weed acres and distribution will surely increase.

Inventoried weed infestations just outside the S-CNF total 8,934 acres and vary from 5,598 acres of weeds associated with the Leadore Ranger District (see Map 3-1) to 366 acres associated with the Yankee Fork Ranger District (Table 3-2). There were no inventoried off-Forest weed infestations associated with either the Challis or Middle Fork Ranger Districts. Spotted knapweed was the most abundant off-Forest weed species for the five Ranger Districts listed in Table 3-2, except for the Lost River Ranger District where spotted knapweed was second to leafy spurge in abundance. Thirteen other weed species were inventoried just outside S-CNF boundaries, with musk thistle, black henbane, hoary cress (whitetop), Canada thistle, and yellow toadflax among the more abundant species.

2) Weed Ecology, Invasion and Spread, Habitat Criteria, and Site Adaptation. Most habitat criteria for weeds are fairly broad, which is one of the characteristics that makes these species so successful in adapting to new environments. Other general characteristics that often aid in the invasion and spread of weeds are their high reproductive potentials; adaptations to disturbed sites; allelopathic (toxic) compounds that provide weeds a competitive edge by suppressing growth of other vegetation; poisonous compounds, latex

sap, barbs, or prickles that make weeds unpalatable; and/or their lack of natural enemies outside their native country and range.

The Forest Service (2001a, c, d) summarized information on the dynamics of weed invasions (Cousens and Mortimer 1995) and methods of weed spread (Roche and Roche 1991), which is presented in the following text. Weeds generally invade a region (such as the Upper Columbia River Basin) through a three-phase process described by Cousens and Mortimer (1995):

Introduction. Because of dispersal, seeds or plant fragments arrive at a site beyond their previous geographic range and establish populations of adult plants. Potential new invaders on the S-CNF such as yellow starthistle could become a serious problem if allowed to advance beyond the introduction phase.

Colonization. The plants in the founding population reproduce and increase in number to form a self-perpetuating colony. Houndstongue is an example of a new weed species in the colonization phase within the S-CNF.

Naturalization. The species establishes new self-perpetuating populations, undergoes widespread dispersal, and becomes incorporated within the native flora. For example, spotted knapweed in particular, musk thistle, and leafy spurge have been naturalized within many areas of the S-CNF ecosystem. These noxious and invasive weed species displace native species and are not filling a vacated niche on the S-CNF.

Invasion and range expansion by a weed involves all three phases. Typically, plant invasions do not occur along a single front. Instead, new outbreaks initiated by long-distance dispersal become the centers for shorter distance dispersal that eventually fills the gaps between them.

The rate at which weed populations expand can be very difficult to determine, and may be exponential (i.e., a constant proportional rate of increase), or two-phased (with sudden range expansion following a period of little increase in abundance).

It is typically only when the naturalization phase is reached that a weed species is likely to be considered a nuisance. Weed control efforts are then focused on limiting further spread of naturalized weeds into previously uninfested areas. Eradication is usually the goal for species considered to be new invaders at a more local level.

Methods of weed spread include forest roads and trails, which serve as corridors for the dispersal of many weed species. Roche and Roche (1991) discuss the historical perspective of meadow knapweed invasion in the Pacific Northwest and cite many older studies documenting the influence of road systems. Weed seeds and plant parts are moved along road systems by vehicles and people, allowing the establishment of weeds into previously uninfested areas. Many of the road systems within the northern part of the S-CNF contain infestations of species such as spotted knapweed. Road corridors allow weeds to invade areas where ground disturbance has taken place (for example, old timber harvest, gravel pits, etc.). Weeds are also transported by wildlife and domestic stock. Weed seeds consumed by animals or birds or attached to their fur or feathers are carried off road and trail corridors into the forest. Some weed seeds are dispersed by the wind, while others are transported to

new sites by streams and rivers. In this manner, weeds have been able to occupy undisturbed habitats far removed from road or trail systems (Forest Service 2001 a, c, d).

TABLE 3-1
Number of Weed Species, Estimated Acres, and Number of Sites of Inventoried Weed Infestations on Ranger Districts of the S-CNF. The Three Dominant Weed Species (acres) are Listed for Each Ranger District[1,2]

Ranger District/Dominant Weed Species (acres)	Total Weed Species	Total Acres	Total Sites
Challis Ranger District	5	1,122	35
1. Spotted knapweed (625)			
2. Musk thistle (487)			
3. Leafy spurge (5)			
Leadore Ranger District	7	1,627	426
1. Spotted knapweed (959)			
2. Musk thistle (442)			
3. Canada thistle (151)			
Lost River Ranger District	8	534	782
1. Leafy spurge (308)			
2. Canada thistle (91)			
3. Bull thistle (69)			
Middle Fork Ranger District	1	25	8
1. Spotted knapweed (25)			
North Fork Ranger District	16	54,638	568
1. Spotted knapweed (54,568)			
2. Sulphur cinquefoil (21)			
3. Canada thistle (12)			
Salmon-Cobalt Ranger District	13	8,182	856
1. Spotted knapweed (7,539)			
2. Bull thistle (370)			
3. Musk thistle (213)			
Yankee Fork Ranger District	4	409	49
1. Canada thistle (241)			
2. Spotted knapweed (120)			
3. Yellow toadflax (43)			
TOTAL		**66,537**	**2,724**

[1]Excludes the Frank Church River of No Return Wilderness.

[2]Acres based on values contained in Appendix B and rounded to the nearest acre.

TABLE 3-2
Species and Acres of Noxious Weeds Inventoried Just Outside the S-CNF Boundaries that are Associated with the S-CNF Ranger Districts

Ranger District	Species	Acres[1]
Leadore	Spotted knapweed	4,585
	Musk thistle	481
	Black henbane	377
	Hoary cress (whitetop)	62
	Canada thistle	50
	Leafy spurge	42
	Russian knapweed	1
Total Acres Associated with District		**5,598**
Lost River	Leafy spurge	1,262
	Spotted knapweed	215
	Black henbane	147
	Musk thistle	17
	Bull thistle	10
	Canada thistle	5
	Diffuse knapweed	1
Total Acres Associated with District		**1,657**
North Fork	Spotted knapweed	511
	Rush skeletonweed	5
	St. Johnswort	5
	Houndstongue	1
	Leafy spurge	1
	Sulphur cinquefoil	< 1
	Hoary alyssum	Present
Total Acres Associated with District		**523**
Salmon-Cobalt	Spotted knapweed	781
	Musk thistle	4
	Leafy spurge	2
	Common tansy	1
	Houndstongue	1
	Canada thistle	< 1
	Black henbane	< 1
	Hoary cress (whitetop)	< 1
	Hoary alyssum	Present
Total Acres Associated with District		**790**
Yankee Fork	Spotted knapweed	297
	Yellow toadflax	50
	Leafy spurge	12
	Canada thistle	7
	Rush skeletonweed	< 1
Total Acres Associated with District		**366**
GRAND TOTAL		**8,934**

[1]Ranger District totals rounded to nearest acre.

There are many weed species of concern on the S-CNF, either because they are presently established (24 species) within the S-CNF boundaries or because they may potentially become established (23 species) and are listed by the State of Idaho as Noxious Weeds.

Table 3-3 lists those 47 species, together with information on their life cycle, mode of reproduction, and habitat criteria/site adaptation that contribute to their invasion and spread. The following text presents additional information on the seven weed species discussed previously (see Table 3-1) that represent the most abundant weed species on the S-CNF Ranger Districts. These species are of particular concern to the S-CNF because of the numbers of acres they have invaded and the potential for further infestations.

Spotted knapweed. This native of Europe is a biennial or a short- to long-lived perennial that grows 3 to 5 feet tall. It is named for the dark fringe on the flower-head that resembles dark spots. This species has invaded the S-CNF from the north (Montana) and now occupies the most land area in the northern Ranger Districts of the S-CNF. Spotted knapweed occurs across approximately 54,568 acres of the North Fork Ranger District, 7,539 acres of the Salmon-Cobalt Ranger District, 959 acres of the Leadore Ranger District, 625 acres of the Challis Ranger District, 120 acres of the Yankee Fork Ranger District, 25 acres of the Middle Fork Ranger District, and 20 acres of the Lost River Ranger District.

Spotted knapweed is an aggressive competitor and reduces biodiversity by outcompeting and eliminating native vegetation. It reduces livestock and wildlife forage and is detrimental to water and soil resources. Sites infested with spotted knapweed have much higher than normal water runoff (56 percent higher) and stream sediment loads (192 percent higher) than non-infested lands (Lacey et al. 1989). Seeds from this species can germinate on sites with a wide range of conditions, and multiple rosettes on a single spotted knapweed root crown are common (Watson and Renney 1974). This species produces an allelopathic compound (cnicin), but its aggressive resource competition has the most impact in determining competitive success over native species (Kelsey and Locken 1989). Spotted knapweed is capable of invading well-managed rangelands, but its rapid establishment and spread are linked to disturbance factors such as fire, road-building, logging, or heavy grazing.

Seeds germinate in fall and early spring. Thirty percent of seeds may be viable after eight years of burial (Davis 1990). Spotted knapweed appears to be best adapted to well-drained, light-textured soils that receive summer rainfall, including habitats dominated by ponderosa pine, Douglas-fir, and shrub-steppe grassland habitats with bluebunch wheatgrass, needle-and-thread, and Idaho fescue (Chicoine 1984).

Musk thistle. This biennial species reproduces by seed and can grow up to 8 feet tall. It forms a rosette the first year after germination, then bolts and produces seeds the second year. This species occupies approximately 486 acres on the Challis Ranger District, 441 acres on the Leadore Ranger District, 213 acres on the Salmon-Cobalt Ranger District, 14 acres on the Lost River Ranger District, and 1 acre on the North Fork Ranger District.

Musk thistle spreads through seed production, with the first flower-heads producing the most seeds. An average plant can produce 10,000 seeds with 33 percent viability (McCarty 1982). The seeds can survive in the soil for more than 10 years, and it may take as many as 15 years to decrease the germination of buried seeds to 1 percent (Burnside et al. 1981). This species needs sun and adequate soil moisture to germinate. It has allelopathic inhibitors that peak when the plant is bolting and the rosette leaves are decomposing (Wardle et al. 1993). This decomposing thistle tissue in the soil stimulates germinating seedlings. Musk thistle abundance decreases in shade and closing canopies (Medd and Lovett 1978).

Canada thistle. This is an aggressive perennial species from Europe that reproduces through both seed production and extensive, creeping roots. It is adapted to a wide range of habitats, but is best adapted to open areas with moderate to moist moisture conditions (Moore 1975). Canada thistle occurs on approximately 241 acres of the Yankee Fork Ranger District, 151 acres of the Leadore Ranger District, 91 acres of the Lost River Ranger District, 35 acres of the Salmon-Cobalt Ranger District, and 12 acres of the North Fork Ranger District.

New shoots begin to emerge when average air temperatures reach 46°F (Hodgson 1968). A single seedling can rapidly form a large dense patch just through vegetative reproduction of the root system (Donald 1994). Depending on the depth of burial, some seeds can remain viable for up to 22 years (Madsen 1962).

Bull thistle. This biennial is native to Eurasia and usually occurs below 7,545 feet elevation. Like many other weed species, it is adapted to areas with ground-disturbance, such as road construction, mining, heavy livestock use, fires, or logging. For this reason, bull thistle is usually found in heavily grazed pastures, along roadsides and other disturbed areas, at edges of dry meadows, and in logged areas—particularly landings where soil disturbance is heaviest (Randall 1991). Bull thistle occurs on approximately 370 acres of the Salmon-Cobalt Ranger District, 69 acres of the Lost River Ranger District, and 1 acre of the North Fork Ranger District.

Bull thistle is an aggressive weed and can form dense patches, which can spread rapidly. Since this species has a tap-root, it reproduces only by seeds and spreads from the point of origin through seed dispersal (Klinkhamer and DeJong 1993). Cultivation, mowing, or hand-pulling just before flowering can control infestations. Mowing works best late in the season, when most of the plants have bolted, but before significant numbers flower (Randall 1990). Plants will sprout from the stem and flower if mown too early. Cut flower-heads left onsite are still able to develop viable seed.

Leafy spurge. This perennial is extremely difficult to eradicate or even control because it spreads by both seeds and extensive roots, which can exceed 20 feet in depth. This plant produces a poisonous latex. This species occupies approximately 308 acres on the Lost River Ranger District, 55 acres on the Leadore Ranger District, 11 acres on the North Fork Ranger District, 5 acres on the Challis Ranger District, and 2 acres on the Salmon-Cobalt Ranger District. Leafy spurge tolerates a wide range of habitats and may occur on rich, moist sites, such as along streambanks, or on extremely nutrient-poor, dry soils typical of many western rangelands. It is most aggressive in semi-arid situations where competition from associated species is less intense. As a result, infestations generally occur and spread rapidly on dry hillsides, dry prairies, or arid rangelands. Although it occurs on all soils, leafy spurge seems best adapted and spreads fastest on coarse-textured soils (Selleck et al. 1962).

Individual leafy spurge flowering shoots may produce up to 250 seeds. For dense patches, this can result in an annual production of more than 8,000 seeds per square yard (Best et al. 1980). Initial seed dispersal is by the 'explosive' rupturing of the mature capsule that can propel the seeds 5 yards (Best et al. 1980). Vegetative reproduction is the primary means of patch expansion once a plant is established at a site.

TABLE 3-3
Potential Habitat for Known Established, New, and Potential Invaders of Weed Species on the S-CNF

Common Name	Scientific Name	Life Cycle	Habitat Criteria and Site Adaptation	Mode of Reproduction
ESTABLISHED INVADERS				
Whitetop (Hoary cress)	*Cardaria draba*	Perennial	Variety of non-shaded, disturbed conditions, including roadsides, waste places, fields, gardens, feed lots, watercourses, open grasslands, and along irrigation ditches. Not particular about soil type, even saline soils, except for highly acidic soils. Most aggressive, rapid expansion occurs in irrigated conditions or during moist years.	Seeds (viable 3 years) and deep creeping roots.
Musk thistle	*Carduus nutans*	Biennial or winter annual	Musk thistle does best after disturbances such as along roadsides, grazed pastures, burned areas, and old fields, but also can invade deferred pastures and native grasslands. It can occur in almost all habitats except dense forests, high mountains, deserts, and frequently cultivated farmlands.	Seeds (prolific seed producer, seeds viable up to 10 years).
Spotted knapweed	*Centaurea maculosa*	Biennial or short- to long-lived perennial	Best adapted to well-drained, light-textured soils in areas that receive some summer rainfall. This includes ponderosa pine and Douglas-fir forests and shrub-steppe habitats with bluebunch wheatgrass (*Agropyron spicatum*), needle-and-thread (*Stipa comata*), and Idaho fescue (*Festuca idahoensis*).	Seeds (viable up to 8 years) and lateral shoots.
Canada thistle	*Cirsium arvense*	Perennial (several ecotypes)	Prefers and is invasive in prairies and other grasslands and riparian areas with deep, well-aerated, mesic soils, but also occurs in almost every upland herbaceous community, especially roadsides, abandoned fields, and pastures.	Seeds, shoots from lateral roots (dormant, buried seeds can remain viable for up to 26 years).
Bull thistle	*Cirsium vulgare*	Biennial	Occurs in dry to moist habitats, fields, pastures, grasslands, roadways, forest clearings, rock outcrops, and along waterways. Does best in areas with moderate slope. It is not shade tolerant.	Seeds (viable for 3 years or less).

TABLE 3-3
Potential Habitat for Known Established, New, and Potential Invaders of Weed Species on the S-CNF

Common Name	Scientific Name	Life Cycle	Habitat Criteria and Site Adaptation	Mode of Reproduction
Leafy spurge	*Euphorbia esula*	Perennial	Occurs on untilled, non-cropland habitats, including both disturbed and undisturbed sites, especially abandoned cropland, pastures, rangelands, woodlands, roadsides, and waste places. Tolerant of a wide range of soils from rich, moist soils of riparian zones to nutrient-poor, dry soils of western rangelands. It is most aggressive in semi-arid situations where competition from associated species is less intense, so invades most rapidly on dry hillsides, dry prairies, or rangelands.	Seeds (viable up to 8 years, usually germinate within 2 years) spreading roots.
Black henbane	*Hyoscyamus niger*	Annual or biennial	Disturbed open sites, roadsides, fields, waste places, and abandoned gardens. Grows best in sandy or well-drained loam soils with moderate fertility. Does not tolerate waterlogged soils.	Seeds (seeds viable for 4 years).
Common mullein	*Verbascum thapsus*	Biennial or short-lived perennial	Natural meadows and forest openings, where it adapts easily to a wide variety of site conditions. Prefers, but is not limited to, dry sandy soils. It is intolerant of shade. Primarily a weed of pastures, hay fields, roadsides, rights-of-way, and abandoned areas.	Seeds (one plant can produce 100,000 to 180,000 seeds with viability up to 100 years).
Cheatgrass	*Bromus tectorum*	Winter annual	Although *Bromus tectorum* can be found in both disturbed and undisturbed shrub-steppe and intermountain grasslands (e.g., where dominant grasses are *Agropyron spicatum* /*Pesudorogneria spicata* and *Festuca idahoensis*), the largest infestations are usually found in disturbed shrub-steppe areas, overgrazed rangeland, abandoned fields, eroded areas, sand dunes, road verges, and waste places.	Seeds.

TABLE 3-3
Potential Habitat for Known Established, New, and Potential Invaders of Weed Species on the S-CNF

Common Name	Scientific Name	Life Cycle	Habitat Criteria and Site Adaptation	Mode of Reproduction
NEW INVADERS				
Hoary alyssum	*Berteroa incana*	Annual, biennial, or short-lived perennial	Meadows, pastures, roadsides, waste places, and rangelands. May outcompete native and cultivated species.	Seeds.
Russian knapweed	*Centaurea repens or Acroptilon repens*	Long-lived perennial (75 years)	Prefers heavy, often saline soils of bottomlands and sub-irrigated slopes and plains. Commonly found along roadsides, riverbanks, irrigation ditches, pastures, waste places, clearcuts, croplands, and hayfields. Prefers similar sites to those occupied by basin wildrye (*Elymus cinereus*). Does not readily establish in healthy native vegetation, requires disturbance.	Rhizomes (new shoots arise from creeping roots, up to 27 root shoots/ft^2 and roots can reach depths to 23 feet). Relatively few seeds are produced (viable for 2 to 3 years).
Rush skeletonweed	*Chondrilla juncea*	Perennial (many biotypes)	Sandy to gravelly, well-drained soils or shallow soils. Seedlings require moisture for up to 6 weeks to develop a persistent root system.	Seeds (up to 15,000/plant annually), lateral roots, and root fragments.
Houndstongue	*Cynoglossum officinale*	Biennial	Well-adapted to forested areas, roadsides, meadows, pastures, and waste places, often found on gravelly, somewhat alkaline soils.	Seeds, attach to fur and clothing.
St. Johnswort	*Hypericum perforatum*	Perennial	Rangeland and pastures (especially when poorly managed), fields, roadsides, forest clearings in temperate regions with cool, moist winters and dry summers. Grows best in open, disturbed sites and on slightly acidic to neutral soils. Does not tolerate saturated soils.	Seeds and rhizomes.
Dyer's woad	*Isatis tinctoria*	Winter annual, biennial, or short-lived perennial	Invades disturbed sites in rangelands, croplands, dry woodlands, and pastures. Can also invade native grasslands that are not highly disturbed.	Seeds.

TABLE 3-3
Potential Habitat for Known Established, New, and Potential Invaders of Weed Species on the S-CNF

Common Name	Scientific Name	Life Cycle	Habitat Criteria and Site Adaptation	Mode of Reproduction
Dalmatian toadflax	*Linaria genistifolla ssp. delmatica*	Perennial	Rapidly colonize open or disturbed areas, especially roadsides, fences, rangelands, croplands, clearcuts, and pastures. Seedlings are ineffective competitors for soil moisture against established perennials and winter annuals, but, once established, both species of toadflax suppress other vegetation mainly by intense competition for limited soil water. Mature plants are particularly competitive with winter annuals and shallow-rooted perennials.	Seeds (up to 500,000 seeds per plant with viability up to 10 to 15 years) and creeping lateral roots.
Yellow toadflax	*Linaria vulgaris*	Perennial		Seeds (up to 30,000 seeds per plant with viability up to 10 to 15 years) and creeping lateral roots.
Scotch thistle	*Onopordum acanthium*	Biennial	Invades most habitats, dry to moist sites: waste places, roadsides, dry meadows, rangelands, pastures, and sometimes waterways.	Seeds (can remain viable for 30 years).
Sulfur cinquefoil	*Potentilla recta*	Perennial (long-lived)	Open grasslands, shrubby areas, open forests, logged areas, roadsides, waste places, and abandoned fields. Sulfur cinquefoil is a species of early succession and forest edge. It cannot survive shade, such as full forest canopy. Sulfur cinquefoil is becoming co-dominant with spotted knapweed on many sites and now is apparently replacing knapweed in some areas of western Montana.	Seeds (viable for at least 4 years) and broken roots can regenerate.
Tansy ragwort	*Senecio jacobaea*	Biennial (rarely annual or perennial)	Invades cut-over forest lands, irrigated and non-irrigated pastures, woodland pastures, and fallow lands. Although it prefers light, well-drained soils in cool, moist climates and rarely is tolerant of high water tables or acidic soils, it can grow throughout most soil moisture regimes, even hot, dry summers, and can over-winter in areas where temperatures reach -20°F or lower if there is good snow cover.	Seeds (viable for at least 6 years) and plants can regenerate top-growth when cut.
Common tansy	*Tanacetum vulgare*	Perennial	Prefers full sun and well-drained but moist soils and is prevalent along ditches, creeks, and roadways. Commonly occurs in disturbed areas at low elevations.	Seeds and rhizomes.

TABLE 3-3
Potential Habitat for Known Established, New, and Potential Invaders of Weed Species on the S-CNF

Common Name	Scientific Name	Life Cycle	Habitat Criteria and Site Adaptation	Mode of Reproduction
Field pennycress	*Thlaspi arvense*	Summer or winter annual	A weed of disturbed or tilled areas.	Seeds, viability from 6 to 20 years depending on depth.
Bur buttercup	*Ranunculus testiculatus*	Annual	Open or disturbed ground in alkaline soils and semi-arid environments.	Seeds.
Blue mustard	*Chorispera tenella*	Winter annual	Dry disturbed sites, winter annual crops, especially winter wheat, roadsides, and waste places. Tolerates a broad range of moisture, temperature, and soil conditions.	Seeds.
POTENTIAL INVADERS				
Jointed goatgrass	*Aegilops cylindrica*	Winter annual	Wheatfields, grasslands, roadsides, fence rows, and other agriculture sites, mainly infests cropland.	Seeds (viable in soil up to 6 years).
Skeletonleaf bursage	*Ambrosia tomentosa*	Perennial	Poorly drained sites, subirrigated pastures, and irrigated land.	Seeds and deep creeping rhizomes.
Diffuse knapweed	*Centaurea diffusa*	Annual, biennial, or short-lived perennial	Disturbed or overgrazed lands are prime habitat, but can also invade undisturbed grasslands, shrublands, riparian communities, forested benchlands, and rugged terrain.	Seeds (up to 18,000 per plant).
Meadow knapweed	*Centaurea pratensis*	Perennial	Prefers moist roadsides, gravel bars, river banks, irrigated pastures, moist meadows, and forest openings.	Seeds.
Yellow starthistle	*Centaurea solstitialis*	Winter annual or biennial	Best adapted to open grasslands with deep well-drained soils and average annual precipitation of 10 to 60 inches.	Seeds (up to 10 years dormancy and viability).
Poison hemlock	*Conium maculatum*	Biennial, winter annual, or rarely perennial	Commonly occurs along roadsides, field margins, ditches, and in low-lying waste places. Can invade native riparian woodlands and open floodplains along waterways.	Seeds.

TABLE 3-3
Potential Habitat for Known Established, New, and Potential Invaders of Weed Species on the S-CNF

Common Name	Scientific Name	Life Cycle	Habitat Criteria and Site Adaptation	Mode of Reproduction
Field bindweed	*Convolvulus arvensis*	Perennial	Agricultural lands and areas with similar disturbance regimes (little competition, repeated disturbance, and high light) are ideal for growth of this species.	Seeds (viable up to 50 years) and creeping deep roots.
Common crupina	*Crupina vulgaris*	Winter annual	Waste areas, arid hillsides, rangelands, and grassy slopes.	Seeds (viable 3 years or less).
Scotch broom	*Cytisus scoparius*	Woody perennial	Prefers sandy soils.	Seed, some sprouting (viable up to 80 years).
Toothed spurge	*Euphorbia dentata*	Annual	Pastures, hayfields, roadsides, and other non-crop areas.	Seeds.
Meadow hawkweed	*Hieracium pratense*	Perennial	Elevational range of 2000 to 5500 ft. in abandoned farmlands, pastures, lawns, fields, roadsides, mountain meadows, and forest clearings. They do not tolerate full shade, so they are not found in densely forested areas, but can dominate forest openings and margins. Prefer well-drained, coarse-textured soils moderately low in organic matter.	Seeds (wind-adapted), stolons, and rhizomes.
Orange hawkweed	*Hieraclum aurantiacum*	Perennial		Seeds (wind-adapted), stolons, and rhizomes.
Perennial pepperweed	*Lepidium latifolium*	Perennial	Can invade wide range of sites, but occurs most frequently in riparian zones, marshes, irrigation canals, wetlands, and floodplains. Can also prosper along roadsides, hay meadows, and rangelands.	Seeds and creeping roots.
Purple loosestrife	*Lythrum salicaria*	Perennial	Grows in wetlands, bogs, along stream and river banks, lake shores, in ditches, and disturbed wet soil areas.	Seeds and rhizomes.
Milium	*Milium vernale*	Winter annual	Sandy and other light soils that are moist in winter.	Seeds.

TABLE 3-3
Potential Habitat for Known Established, New, and Potential Invaders of Weed Species on the S-CNF

Common Name	Scientific Name	Life Cycle	Habitat Criteria and Site Adaptation	Mode of Reproduction
Eurasian watermilfoil	*Myriophyllum spicatum*	Perennial	Prefers lakes, ponds, and slow-moving rivers and streams, but can also grow in fast-moving water.	Produces seeds (rarely), but prolifically spread by runners and autofragments.
Matgrass	*Nardus stricta*	Perennial	Disturbed or heavily grazed grasslands.	Seeds.
Silverleaf nightshade	*Solanum elaeagnifolium*	Perennial	Disturbed sites such as fallow fields, gardens, and vacant areas, especially those with sandy soil.	Seeds and spreading rhizomes.
Buffalo bur	*Solanum rostratum*	Annual	Native to the central U.S. Adapted to sandy soil but able to grow on a wide range of soils from dry, hard soils to rich, moist soils.	Seeds.
Perennial sowthistle	*Sonchus arvensis*	Perennial	Adapted to many soil types and moisture regimes, seems to prefer low, fine-textured soils, like loams, and does better under alkaline or neutral conditions.	Seeds (2 to 5 year viability) and spreading, thickened horizontal roots (rhizomes).
Johnsongrass	*Sorghum halepense*	Perennial	Disturbed lands, such as ditches, cultivated fields, and idle farmlands. Most of the ecotypes are frost sensitive; cold-tolerant ecotypes have been found growing as far north as southern Canada.	Seeds and rhizomes.
Puncturevine	*Tribulus terrestris*	Annual	Grows on disturbed sites where it needs relatively high temperatures for germination and growth. Adapted to a wide range of soil conditions.	Seeds (viable in soil 4 to 5 years).
Syrian bean caper	*Zygophyllum fabago*	Perennial	Grows in disturbed areas, dry grasslands, and deserts in open, rocky soils, gravelly soils, sandy soils, and silt loam soils.	Seeds and lateral roots and root pieces.

Yellow toadflax. This perennial is becoming established in many areas of Idaho. It is a prolific seed producer. A mature plant can produce up to 30,000 seeds annually, and a stem has been reported to contain more than 5,000 seeds (Saner et al. 1995). This species can also reproduce vegetatively. Stems develop from adventitious buds on both primary and lateral roots. Vegetative reproduction from roots or root buds can occur as early as 2 to 3 weeks after germination. Vegetative reproduction is possible from root fragments only 1 centimeter long (Zimmerman 1996). This species is adapted to disturbance. Initially, seedlings are poor competitors and establishment is difficult where competitive vegetation is present. Yellow toadflax occurs on approximately 43 acres of the Yankee Fork Ranger District, 21 acres of the Salmon-Cobalt Ranger District, 8 acres of the North Fork Ranger District, and 1 acre of both the Challis and Lost River Ranger Districts.

Sulfur cinquefoil. This perennial has a woody rootstock, which sends up several vegetative shoots. Sulfur cinquefoil can form large patches in rangeland, roadsides, waste places, and unworked fields, where it is not easily controlled by mowing (Werner and Soule 1976). It is a strong competitor on many grazed rangeland sites because its high tannin content makes it unpalatable to most wildlife and livestock. In areas where sulfur cinquefoil grows with spotted knapweed, cattle will graze the knapweed over the cinquefoil (Rice et al. 1991). Sulfur cinquefoil occurs on 21 acres of the North Fork Ranger District and 1 acre of the Salmon-Cobalt Ranger District.

3) Historical Comparisons. The history and past treatments of weed infestations on the S-CNF were described in Chapter 1, *Section 1.C, Purpose and Need for Action,* and are compared here to present levels and species of weed infestations on the S-CNF. Noxious weed control on what is now the S-CNF began with the completion of NEPA documents (EAs) in the late 1980s for noxious weed management on the Salmon and Challis National Forests. An IPM weed control plan was adopted by the Salmon National Forest in 1987 and by the Challis National Forest in 1989 that focused on weed species of concern at that time. These species included established and/or new populations of spotted knapweed, leafy spurge, Canada thistle, musk thistle, and black henbane. Identified potential invaders included yellow toadflax on both the Salmon and Challis National Forests, and diffuse knapweed, yellowstar thistle, and dalmatian toadflax on the Challis National Forest.

Most weed species of concern in the late 1980s are among the same seven weed species of particular concern to the S-CNF today (see Table 3-1). Although not ranked among the most abundant weed species listed in Table 3-1, black henbane (a focus species in the late 1980s) continues to be present and of concern on the S-CNF. Black henbane presently occurs on approximately 25 acres of the Lost River Ranger District, 19 acres of the Leadore Ranger District, and 1 acre each of the North Fork and Salmon-Cobalt Ranger Districts. Bull thistle was not listed among the focus weed species for the Salmon and Challis National Forests, but today is present and of concern on the S-CNF, as are all of the weed species listed in Table 3-1.

Perhaps the most significant change in weed infestations on the S-CNF has been the tremendous increase in the occurrence of spotted knapweed. In 1987, spotted knapweed was estimated to cover a project area of approximately 1,000 acres in five drainages on the North Fork Ranger District, with approximately 120 acres targeted for treatment using biological controls. On the Salmon and Cobalt Ranger Districts in 1987, spotted knapweed covered a project area of approximately 100 acres in two drainages, with about 10 acres

targeted for treatment using herbicides. Today, spotted knapweed occupies approximately 54,568 acres at approximately 500 sites on the North Fork Ranger District and 7,539 acres at more than 500 sites on the Salmon-Cobalt Ranger District. Spotted knapweed also is present, but much less abundant, on all of the other S-CNF Ranger Districts.

The Forest Service (1987a, 1989) implemented the annual treatment of 200 to 300 acres of noxious weeds on both the Salmon and Challis National Forests beginning in the late 1980s. Weed treatments were very limited prior to 1995, but since then have generally increased each year from 586 acres treated in 1995 to 3,371 acres treated in 2001. Much of the early work was done in the North Fork Ranger District. Since 1995, virtually all of these acreages were treated using herbicides. However, biocontrol efforts were initiated in the late 1980s in the North Fork Ranger District. Size of the weed treatment area on the S-CNF in 2001 is equivalent to about 5 percent of the known, inventoried weed infestations present on the S-CNF.

b. Plant Communities

Potential Vegetation Groups (PVGs) are representative potential vegetation types that have similar environmental conditions and are dominated by similar plants and usually by similar life forms. The S-CNF is composed of PVGs as defined for the Interior Columbia Basin (Wisdom et al. 2000). The 10 PVGs for the S-CNF are: Cold Forest, Moist Forest, Dry Forest, Cool Shrub, Dry Shrub, Dry Grass, Woodland, Riparian Herbaceous, Riparian Woodland, and Riparian Shrub. Map 3-9 (back of chapter) depicts the locations of PVGs on the S-CNF. The PVGs were spatially identified from computer-enhanced color spectral band satellite imagery. Within each PVG are several categories of Potential Vegetation Types (PVTs), which are classified by the physical and biological environment, on the principle that the physical environment significantly influences vegetation growing on a given site. Each PVT category is named for its dominant species, whether that species remains onsite or not. There is considerable debate on whether the S-CNF supports the Dry Grass PVG. It is strongly believed the grassland community types present on the Forest are seral stages to the shrub-dominated Dry and Cool Shrub PVGs. However, for this discussion, the Dry Grass PVG will be described separately.

1) Plant Communities Susceptible to Invasive Weeds. The key component most affected by weed expansion and/or management practices is plant community composition. Many other resource values revolve around the plant community, such as sensitive plant species, wildlife and aquatic species and habitat (including threatened, endangered, and sensitive species), roadless values, recreation, and visual quality. Plant communities most susceptible to weed invasion occupy areas of relatively low precipitation and low production, and have relatively open canopies without substantial shade. Other plant communities are susceptible because of soil disturbance resulting from the removal of native vegetation caused by livestock grazing, roads, timber harvest, recreation activities, and fire. Plant community cover types present within the S-CNF that are susceptible to invasive weeds and can be influenced by weed expansion and/or management practices are listed below. Their susceptibility to the seven most abundant weed species on the S-CNF is listed in Table 3-4. The susceptibility of burned areas to these seven weed species also is listed in Table 3-4, and in all cases is high.

TABLE 3-4
Likelihood of Invasion of the Most Susceptible Broad-Scale Plant Community Types and Burned Areas on the S-CNF by the Seven Most Abundant Weed Species

		Weed Species						
Potential Vegetation Group (PVG)	**Plant Community Type**	**Spotted Knapweed**	**Musk Thistle**	**Canada Thistle**	**Bull Thistle**	**Leafy Spurge**	**Yellow Toadflax**	**Sulfur Cinquefoil**
Dry Grass/Dry Shrub	Grassland/Shrub-steppe	High	Moderate-High	High	Moderate	High	High	High
Cool Shrub	Shrub-steppe	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Dry Forest	Ponderosa pine	High	Moderate	Moderate	Moderate	Moderate	Moderate	High
Dry Forest	Douglas-fir	High	High	High	High	Moderate	Moderate	High
Riparian Herb, Shrub, and Woodland	Riparian Areas	High	Moderate-High	High	High	Moderate	Moderate	High
N/A	Burned Areas	High	High	High	High	High	High	High

Adapted from An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins, Volume II, Table 3.174, June 1997, and from Lolo National Forest Big Game Winter Range and Burned Area Weed Management Final EIS, Table III-3, July 2001.

High = high susceptibility to invasions-Invasive weed species invades the cover type successfully and becomes dominant or co-dominant even in the absence of intense or frequent disturbance.

Moderate = moderate susceptibility to invasion-Invasive weed species is a “colonizer,” and invades the cover type successfully following high intensity or frequent disturbance that impacts the soil surface or removes the normal canopy.

Low = low susceptibility to invasion-Invasive weed species does not establish because the cover type does not provide suitable habitat.

The extent of current inventoried weed infestation by PVG is shown in Table 3-5. These PVGs correspond roughly with wildlife source habitats discussed in Table 3-14, Chapter 3. Table 3-5 indicates that the North Fork Ranger District is most heavily infested by weeds and that the dry forest-ponderosa pine PVG has the most weed-infested area. This one PVG in the North Fork Ranger District has about 57 percent of the inventoried weed-infested land on the entire S-CNF (37,866 of 66,537 acres). About 75 percent of the dry forest-ponderosa pine PVG on the North Fork Ranger District is occupied by weeds. The dry grass type on the same Ranger District has the second highest rate of infestation with 10,413 acres or 16.5 percent of this PVG on this Ranger District. The dry shrub, cool shrub, and dry grass PVGs also have relatively high rates of weed infestation compared to the other vegetation types. These same PVGs are the most susceptible to future weed infestations.

TABLE 3-5
Inventoried Weed Infestations on the S-CNF by Potential Vegetation Group[1]

	Total (acres)	Weed Infestation (acres)	Infested Area (percent)
Challis Ranger District			
Cool Shrub	75,161	121	0.16
Dry Forest – Douglas-Fir	153,943	108	0.07
Dry Forest – Ponderosa Pine	137	0	0.00
Dry Grass	33,889	94	0.28
Dry Shrub	35,651	641	1.80
High Elevation (Cold Forest)	140,133	15	0.01
Other	1,127	0	0.00
Riparian	14,946	140	0.94
Woodland	6,326	4	0.07
Total:	***461,313***	***1,123***	***0.24***
Leadore Ranger District			
Cool Shrub	49,442	561	1.14
Dry Forest – Douglas-Fir	131,257	475	0.36
Dry Grass	33,214	142	0.43
Dry Shrub	9,124	213	2.33
High Elevation (Cold Forest)	73,624	18	0.02
Other	3,006	28	0.92
Riparian	27,683	174	0.63
Woodland	2,088	15	0.70
Total:	***329,437***	***1,626***	***0.49***
Lost River Ranger District			
Cool Shrub	255,348	176	0.07
Dry Forest – Douglas-Fir	145,588	82	0.06
Dry Grass	41,937	56	0.13

TABLE 3-5
Inventoried Weed Infestations on the S-CNF by Potential Vegetation Group[1]

	Total (acres)	Weed Infestation (acres)	Infested Area (percent)
Dry Shrub	60,030	138	0.23
High Elevation (Cold Forest)	237,913	23	0.01
Other	5,623	4	0.07
Riparian	42,838	42	0.10
Woodland	26,651	12	0.04
Total:	***815,928***	***533***	***0.07***
Middle Fork Ranger District			
Cool Shrub	140	0	0.00
Dry Forest – Douglas-Fir	25,833	0	0.00
Dry Forest – Ponderosa Pine	170	0	0.00
Dry Grass	6,656	15	0.22
High Elevation (Cold Forest)	8,873	0	0.00
Other	127	0	0.00
Riparian	5,031	10	0.20
Woodland	10	0	0.00
Total:	***46,841***	***25***	***0.05***
North Fork Ranger District			
Cool Shrub	3,742	377	10.07
Dry Forest – Douglas-Fir	236,875	0	0.00
Dry Forest – Ponderosa Pine	50,533	37,866	74.93
Dry Grass	63,220	10,413	16.47
Dry Shrub	7,009	911	13.00
High Elevation (Cold Forest)	25,518	2,415	9.46
Other	996	626	62.88
Riparian	29,289	1,791	6.11
Woodland	1,160	241	20.81
Total:	***414,599***	***54,640***	***13.18***
Salmon-Cobalt Ranger District			
Cool Shrub	52,178	1,778	3.41
Dry Forest – Douglas-Fir	418,451	2,903	0.69
Dry Forest – Ponderosa Pine	9,353	598	6.39
Dry Grass	57,090	1,485	2.60
Dry Shrub	6,677	457	6.85
High Elevation (Cold Forest)	31,764	354	1.11

TABLE 3-5
Inventoried Weed Infestations on the S-CNF by Potential Vegetation Group[1]

	Total (acres)	Weed Infestation (acres)	Infested Area (percent)
Other	1,600	78	4.87
Riparian	45,660	489	1.07
Woodland	988	40	4.06
Total:	***571,583***	***8,182***	***1.43***
Yankee Fork Ranger District			
Cool Shrub	52,719	126	0.24
Dry Forest – Douglas-Fir	233,137	23	0.01
Dry Grass	30,138	0	0.00
Dry Shrub	7,209	190	2.64
High Elevation (Cold Forest)	68,228	30	0.04
Other	1,234	3	0.22
Riparian	31,370	14	0.04
Woodland	619	22	3.57
Total:	***424,653***	***408***	***0.10***
GRAND TOTAL:	***3,064,355***	***66,537***	***2.17***

[1]Values may contain slight rounding error.

a) Dry Grass Potential Vegetation Group

Grassland communities within the S-CNF include foothill grassland with the following characteristic species:

Bunchgrass Type has some combination of bunchgrasses, particularly bluebunch wheatgrass (*Agropyron spicatum*) and Idaho fescue (*Festuca idahoensis*). Other important species are Sandberg's bluegrass (*Poa secunda*), prairie junegrass (*Koelaria macrantha*), and arrowleaf balsamroot (*Balsamorhiza sagittata*). When these grasslands are disturbed by frequent fires or heavy use, they may no longer support bunchgrass but may instead support cheatgrass (*Bromus tectorum*) or Japanese brome (*Bromus japonicus*).

Fescue Grassland Types often occur in mountain meadows and are characterized by Idaho fescue. Other species that occur with Idaho fescue are tufted hairgrass (*Deschampsia caespitosa*) and sedges.

b) Dry Shrub Potential Vegetation Group

The Dry Shrub Type occurs extensively in the lowest elevations within the river breaks or corridors of the main stem of the Salmon River and adjacent to BLM lands, especially on the hotter, drier southerly aspects. These communities usually have bluebunch wheatgrass and Idaho fescue, but are also susceptible to invasion by cheatgrass (*Bromus tectorum*) or Japanese brome (*Bromus japonicus*) if disturbed. The Dry Shrub communities are also found

at moderate elevations nearing the ponderosa pine (*Pinus ponderosa*) and Douglas-fir (*Pseudostuga menziesii*) series on favorable southerly aspects where they occur as scattered openings.

- Wyoming Big Sagebrush Type (ARTRW) is dominated by Wyoming big sagebrush (*Artemisia tridentata* var. *wyomingensis*) with an understory dominated by bluebunch wheatgrass and bluegrasses.
- Threetip Sagebrush Type (ARTR4) is dominated by either threetip sagebrush (*Artemisia tripartita*) or antelope bitterbrush (*Purshia tridentata*) with understories of bluebunch wheatgrass, arrowleaf balsamroot, Idaho fescue, rabbitbrush, and needle-and-thread.
- Black Sagebrush Type (ARARN) is dominated by black sagebrush (*Artemisia nova*) with bluebunch wheatgrass and/or Idaho fescue.
- Low Sagebrush Type (ARAR8) is dominated by low sagebrush (*Artemisia arbuscula*) with bluebunch wheatgrass and/or Idaho fescue. Low sagebrush often also occurs with junegrass, rabbitbrush, and Sandberg's bluegrass.

c) Cool Shrub Potential Vegetation Group

This vegetation group is characterized by the presence of mountain big sagebrush (*Artemisia tridentata* var. *vaseyana).* This species generally is dominant at mid-elevation, cooler sites rather than Wyoming big sagebrush. On the S-CNF, mountain big sagebrush occurs with bluebunch wheatgrass and/or Idaho fescue. On slightly moister sites, mountain big sagebrush is often replaced as dominant by either serviceberry (*Amelanchier alnifolia*) or chokecherry (*Prunus virginiana*) and Idaho fescue. Mountain big sagebrush also grows in openings or in the understory of open stands of Douglas-fir.

d) Dry Forest Potential Vegetation Group

This group consists of four types: Douglas-fir with ponderosa pine, Douglas-fir without ponderosa pine, ponderosa pine grassland, and Douglas-fir grassland. It occupies the broadest range of environmental conditions of any conifer-dominated plant communities within the S-CNR. Habitat types common within this series range from savannah-like stands of Douglas-fir/bluebunch wheatgrass and Douglas-fir/ldaho fescue to very dense mixed stands of Douglas-fir and ponderosa pine in the Douglas-fir/ninebark habitat type. Ponderosa pine often with lodgepole pine (*Pinus contorta*) is a common seral species in many of the habitat types within this series (Steele et al. 1981). Large, essentially pure stands of Douglas-fir are present in the Douglas-fir/pinegrass habitat type at mid-elevation throughout the S-CNF.

The ponderosa pine grassland replaces the extensive sagebrush/bunchgrass communities at slightly higher elevations where minimum moisture requirements for pine establishment occur. Ponderosa pine stands thus constitute the lower elevation timberline with ponderosa pine/bluebunch wheatgrass, ponderosa pine/Idaho fescue, and ponderosa pine/common snowberry (*Symphoricarpos albus*) being the most common habitat types present. These habitat types are most prevalent between elevations of approximately 3,500 feet and 5,500 feet within the S-CNF. The ponderosa pine/bluebunch wheatgrass habitat type occupies the warmer, drier southerly aspects while ponderosa pine/Idaho fescue occurs on

the more moist north slopes. Ponderosa pine/common snowberry generally occupy less steep sites such as stream terraces and alluvial fans.

Douglas-fir grasslands are similar to ponderosa pine grasslands but usually occur at slightly higher elevations and have Idaho fescue as the dominant understory grass.

e) Riparian Herb, Shrub, and Woodland Potential Vegetation Group (Riparian Community Types)

Riparian communities that occur within the S-CNF are dominated by coniferous trees, deciduous trees, shrubs, and herbaceous vegetation (Youngblood et al. 1985). At mid to high elevations, Engelmann spruce (*Picea engelmannii*) and subalpine fir (*Abies lasiocarpa*) form the tree canopy in the conifer-dominated riparian communities. At lower elevations, these communities often contain aspen and/or cottonwood (*Populus trichocarpa*) as co-dominant species (Padgett et al. 1989). These species occur along with dense shrub layers of species such as willows and red-osier dogwood (*Cornus sericea*). At mid to lower elevations, lodgepole pine (*Pinus contorta*), Douglas-fir, and/or ponderosa pine also occur in riparian communities. Both willow and non-willow shrub-dominated riparian communities occur at all elevations on the S-CNF. Riparian communities dominated by herbaceous plants including grasses, forbs, and grass-like species (i.e., sedges and rushes) occur throughout the S-CNF. These communities represent a broad environmental spectrum ranging from ponds or perennially saturated sites to sites that are only wet seasonally (Padgett et al. 1989).

f) Woodland Potential Vegetation Group

Woodland Types within the S-CNF are dominated by mountain mahogany (*Cercocarpus ledifolius*) or aspen (*Populus tremuloides*).

Mountain Mahogany Type often has understories of needle-and-thread, bluebunch wheatgrass, Indian ricegrass (*Oryzopsis hymenoides*), and rabbitbrush. This type usually occurs as scattered stands. It is associated with limestone parent material and occurs within areas dominated by this series, especially on extremely rocky, harsh, southern-exposed slopes within the river canyons.

Aspen Type occurs on upland positions in either almost pure stands or mixed with conifers, usually Douglas-fir. This type often occurs in swales, in or adjacent to talus slopes, in snow pockets, or moister soil types within the S-CNF.

2) Plant Communities Less Susceptible to Invasive Weeds. Several Cold Forest Vegetation Groups, one Moist Forest Vegetation Group, and high elevation non-forested alpine areas are plant communities that also occur in the S-CNF, but that generally are not vulnerable to noxious weed invasion until they are disturbed by logging, windthrows, fires, or other disturbance. Cold Forest Types dominated by Douglas-fir and/or lodgepole pine are widespread at mid-elevations across the S-CNF. Cold Forest Types at high elevation (or at lower elevation in frost pockets) are generally dominated on dry sites by subalpine fir and/or Engelmann spruce, sometimes in combination with Douglas-fir. There is also a Moist Spruce-Fir Type that occurs on moister sites at mid to high elevations as described above under Riparian Herb, Shrub, and Woodland. On high elevation sites with stony soils, whitebark pine (*Pinus albicaulis*) often replaces the spruce-fir series (Johnson 1995). Limber

pine (*Pinus flexilis*) occasionally occurs on sunny, high elevation talus slopes, rocky ridges, or high, rocky valley bottoms.

If extensive land disturbance such as the recent wild fires on portions of the S-CNF occurs within these communities or vegetation group types, they may become more vulnerable to invasive weeds. Wild fires alter site characteristics and native vegetation by removing native plant cover and competition, exposing bare soil, altering soil physical properties, and disrupting normal plant/soil interactions. These conditions can last from just one growing season to a few years to many decades dramatically increasing the risk of weed establishment and expansion well into the future. This is especially true of hot, large-scale wild fires that remove significant natural shade and open formerly closed forest canopies to burgeoning weed populations.

3) Other Plant Communities. Plant communities that also occur in the S-CNF but that generally are not vulnerable to noxious weed invasion until they are disturbed by logging, windthrows, fires, or other disturbance include subalpine fir, whitebark pine, non-forested alpine, and Engelmann spruce series. If extensive land disturbance such as the recent wild fires on portions of the S-CNF occurs within these communities, it may make them more vulnerable to invasive weeds. This is especially true of hot, large-scale wild fires that remove significant natural shade and open formerly closed forest canopies to burgeoning weed populations.

4) Range and Riparian Condition. The Salmon and Challis Land and Resource Management Plans (LRMPs) displayed rangeland conditions that were inventoried in the late 1970s and 1980s. Of the allocated suitable rangelands, 43 percent were in excellent to good condition, 43 percent were in fair condition, and 14 percent were in less than satisfactory (poor to very poor) condition. Trend evaluations were reported in the S-CNF Monitoring and Evaluation Reports for Fiscal Years 1995 and 1996. Condition and trend studies were performed on more than 125 sites indicating 30 and 33 percent (respectively) had met objectives, 68 and 57 percent (respectively) were moving toward objectives, and 2 and 10 percent (respectively) were not meeting objectives.

Riparian condition descriptions in regard to vegetation community types are lacking in the two Forest Plans. Riparian condition was related to channel stability in the Challis LRMP. Of the 3 percent land base considered riparian, 24 percent was evaluated as being in a less than satisfactory condition based on channel stability assessments. Since the preparation of the Forest Plans, channel stability monitoring has increased throughout the Forest. The S-CNF Monitoring and Evaluation Reports for Fiscal Years 1995 and 1996 show monitoring sites of 102 and 100 sites, respectively, with 88 percent and 79 percent showing greater than 80 percent bank stability. These sites are not necessarily repeat measurements on the same site, however, those that were and that showed reduced stability were shifts between the highest class (90 to 100 percent stability) to the next class (80 to 90 percent stability). This apparent reduction in channel stability was attributed to the high flows experienced in 1996. Greenline studies designed to monitor the long term trend of vegetation community types were initiated in the mid 1990s on a few selected streams. Since then, permanent greenline studies have expanded throughout the Forest. Although shifts to more desirable riparian vegetation community types have been noted, it is too early to make definitive conclusions on riparian trends.

c. Plant Management Indicator Species

Several plant species were identified in the Challis Land and Resource Management Plan (USFS 1987c) as management indicator species (MIS). MIS are considered to be key species that represent life forms and have habitat requirements similar to other groups of plants. They are species for which populations and habitat objectives can be established, and will be tracked as indicators of habitat capability.

Of the eight plant MIS species, five are used to identify unsatisfactory conditions or trends either as increasing in abundance from naturally occurring levels or by their presence within a native vegetation community. Each is described below by life form.

Shrubs: Big sagebrush (*Artemisia tridentata*); three subspecies represented by basin big sagebrush (*tridentata*), Wyoming big sagebrush (*wyomingensis)*, and mountain big sagebrush (*vaseyana*). The basin and Wyoming big sagebrush community types occur in the Dry Shrub PVG while the mountain big sagebrush occurs in the Cool Shrub PVG. Increases in big sagebrush over 20 percent of natural levels indicate a decreasing ecological condition. Bitterbrush (*Purshia tridentata*) is recognized as important wildlife winter forage. Bitterbrush can occur in the transition zone between the Dry Shrub and Cool Shrub PVGs and can become co-dominant with mountain big sagebrush in the Cool Shrub PVG.

Grasses: Bluebunch wheatgrass (*Agropyron spicatum*) and Idaho fescue (*Festuca idahoensis*) are indicative of climax rangeland conditions. These grasses often occur together in varying amounts depending on the site in the Dry Grass PVG. However, bluebunch wheatgrass is typically the dominant grass in the Dry Shrub PVG while Idaho fescue dominates the Cool Shrub PVG.

Forbs: Western yarrow (*Achillea millefolium*) and Canada thistle (*Cirsium arvense*) are indicative of disturbance in riparian areas. Western yarrow is a native perennial forb while Canada thistle is a state listed noxious weed and a target species in the weed treatment activities assessed in this Final EIS.

d. Threatened, Endangered, and Sensitive Plants

There are no federally listed threatened or endangered plant species present on the S-CNF.

1) Sensitive Species. Forest Service Manual (FSM) 2670.5 defines sensitive species as "those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers, density, or habitat capability that reduce a species/existing distribution." In FSM 2670.22, management direction for sensitive species is, in part, to ensure that species do not become threatened or endangered because of Forest Service actions, and to maintain viable populations of all native species (U.S. Forest Service 1990a). In addition to Forest Service Region 4 sensitive species, the State of Idaho keeps current listings for all state-sensitive species by county where populations are known to occur. The S-CNF encompasses land across parts of four counties: Custer, Lemhi, Butte, and Blaine. All sensitive species and species of concern for these four counties are listed in Table 3-6 together with each species' status and habitat characteristics. These lists are subject to change as species are added, removed, or recategorized.

Not all of the state-sensitive species listed in Table 3-6 are likely to occur on the S-CNF. Appendix H presents the occurrence of sensitive plant species on the S-CNF by Ranger District and HUCs 4 and 5. Twenty-five species have been identified as sensitive by Forest Service Region 4 and are of special concern to the S-CNF, either because of known occurrences or known suitable habitat on the S-CNF. These species are as follows:

Pink Agoseris (*Agoseris lackschewitzii*). This species occurs in wet montane and subalpine meadows in the mountains of northwestern Wyoming, southwestern Montana, and adjacent Idaho. It flowers July to August. In Idaho, it has been found in Fremont and Lemhi Counties where it was growing either in open moist meadows with forbs, grasses, sedges, and rushes or in the ecotone between wet meadows and forests (Jankovsky-Jones 1999). When overstory trees are present they are usually subalpine fir, Engelmann spruce, whitebark pine (*Pinus albicaulis*), and Douglas-fir. Pink Agoseris is known to occur in Lemhi County in the Lemhi Range within the Mill Creek Basin. Associated species are tufted hairgrass, bistort (*Polygonum bistorta*), elephant's-head lousewort (*Pedicularis grounlandica*), and arrowleaf groundsel (*Senecio triangularis*) (NY Botanical Gardens Collection. Collected 1984. Specimen ID: 7047) (U.S. Forest Service 1990b).

Lost River milkvetch (*Astragalus amnis-amissi).* This species is endemic to Custer and Butte Counties. It occurs on ledges and rock crevices of nearly vertical limestone cliffs and in talus at the base. It prefers moist, shaded microsites within these general habitats (NY Botanical Gardens Collection. Collected 1957. Specimen ID: 5308; U.S. Forest Service 1990b). This milkvetch blooms June to July.

Lemhi milkvetch (*Astragalus aquilonius).* Lemhi milkvetch is endemic to east-central Idaho and occurs in Custer, Butte, and Lemhi Counties at lower elevations. It is found on unstable substrates, steep banks, sandy washes, and gullies within the shrub-steppe zone (U.S. Forest Service 1990a). This species blooms May to June.

Meadow milkvetch (*Astragalus diversifolius).* This species is endemic to central Idaho and northern Utah with one historical report for the Green River Basin in western Wyoming. It occurs on moist, often alkaline meadows and in sagebrush valleys.

White Cloud's milkvetch *(Astragalus vexilliflexus var. nubilus).* This species is found in dry, open ridges in the White Cloud Range.

Maritime sedge (*Carex incurviformis* var. *incurviformis).* This sedge occurs in alpine and subalpine zones on moist tundra and wet rock ledges. It is a circumpolar species that is known from high elevation areas in Canada and south to Colorado and California.

Flexible alpine collomia (*Collomia debilis* var. *camporum).* This species occurs on the North Fork of the Salmon River drainage in Idaho and in adjacent Montana. It inhabits stabilized talus slopes (Moseley 1992a).

Douglass' wavewing (*Cymopterus douglassii).* This plant is known from Custer County in Idaho on the Lost River Ranger District at high elevations over 9,000 feet. It occurs in alpine and subalpine zones on open slopes, ridges, and summits with calcareous or dolomitic substrates and blooms from mid-June to August (U.S. Forest Service 1990a). In high mountain cirque terrain it is found on sites that are level, gravelly, and with evidence of frost heaving (Moseley 1992b).

Ibapah wavewing *(Cymopterus ibapensis).* This species occurs in rocky, high-elevation sites in the central mountain region of Idaho.

Rockcress draba (*Draba densifolia apiculata)*. This species occurs in moist, gravelly alpine meadows and on granitic talus slopes or rock crevices. This species usually prefers limestone-derived soils. It occurs at some high elevation sites in Wyoming, Utah, Montana, central Colorado, and Idaho.

Stanley whitlow-grass (*Draba trichocarpa)*. This species is endemic to Idaho and all known populations are restricted to granite outcroppings surrounding the floor of the Stanley Basin in south-central Idaho. It is found in sagebrush/Idaho fescue (*Artemisia arbuscula* ssp. *thermopola/Festuca idahoensis*) habitat type variation with a mosaic that includes mountain big sagebrush (Moseley and Mancuso 1990). On a majority of sites, it was found growing with guardian buckwheat (see listing below). Both of these species were found on gentle ridgelines that are relatively stable and on steep rock outcrops and scree slopes (Moseley and Mancuso 1993).

Welsh's buckwheat (*Eriogonum capistratum* var. *welshii)*. This species occupies rocky volcanic slopes. It is often associated with scattered sagebrush and grasses, usually at higher elevations.

Guardian buckwheat (*Eriogonum meledonum)*. This species is endemic to Custer County in central Idaho. It occurs on unstable scree slopes on granitic parent materials (U.S. Forest Service 1990a).

Bugleg goldenweed (*Haploppus insecticruris)*. Known distribution for this species is south-central Idaho in Camas and Elmore Counties. It inhabits sagebrush and grass meadows at 5,000 to 6,000 feet in elevation and blooms in July and August (U.S. Forest Service 1990a).

Bank monkeyflower (*Mimulus clivicola)*. This plant is a regional endemic known from northern and west-central Idaho into northeastern Oregon. It is a small annual that produces a showy pink flower that blooms from late May through mid-July. The general habitat is open ponderosa pine stands within mesic macroclimates (such as moist drainages). Specific habitat requirements are very restricted: southern aspects between 1,500 and 4,100 feet in elevation, in moist pockets of open mineral soil (such as a depressions in game trails) (Lorain 1993). There are no known occurrences on the S-CNF, but many areas of potential habitat. There is no way of knowing how much potential habitat meets the specific microsite requirements for this species.

Challis crazyweed (*Oxytropis bessyi* var. *salmonensis*). This is a species of sagebrush and salt desert shrub habitat. It occurs in sandy washes and open slopes with rocky volcanic soils where it blooms June through July (U.S. Forest Service 1990a).

Lemhi penstemon (*Penstemon lemhiensis)*. This species is endemic to Lemhi County and adjacent counties in Montana. Its bright sky-blue flowers appear from June to July. This penstemon is an early seral species that requires bare soil to become established. It appears to be dependent on small-scale disturbances and has adapted to man-made disturbed sites, such as road cuts and fills and responds favorably after fire. It occurs in a variety of habitats, including dry grasslands, three-tipped sage/Idaho fescue and big sagebrush/needle-and-thread communities, mountain big sagebrush/bluebunch wheatgrass, open conifer

ponderosa pine or Douglas-fir/grass lands, and ecotones between forest and shrub-steppe. It occurs at elevations from 3,200 to 8,100 feet (Moseley et al. 1990a; Moseley 1992a).

Since this species is widely adapted, there are many acres of apparently suitable habitat on the S-CNF. The characteristics of these potential sites give this species a high potential for occurring in areas that weeds also tend to prefer.

Salmon twin bladderpod (*Physaria didymocarpa* var. *lyrata)*. This perennial mustard is endemic to Idaho. Until the 1980s, it was known only from one location on BLM land at Williams Creek in the Salmon River Mountains, then three new populations were found on private and BLM land (Hitchcock 1964; Steele 1977; Steele 1981; Steele 1983). In 1990, a specific search of the Salmon National Forest found no populations of Salmon twin bladderpod (Moseley et al. 1990b). Suitable habitat is believed to occur at lower elevations, just outside the S-CNF boundary, on drainages with headwaters in the S-CNF. All known populations are near the boundary of the S-CNF.

This species is found on scablands, shale banks, talus slopes, and gravelly soil (U.S. Forest Service 1990a). It grows on steep south-facing slopes between 4,050 and 6,800 feet in the big sagebrush/bluebunch wheatgrass zone. It has been found growing on loose, but stable, substrate along roadcuts and other disturbance sites. It is generally found on sites with little plant cover (Moseley et al. 1990b). These are the same site characteristics that weeds tend to prefer.

Marsh's bluegrass (*Poa abbreviata* ssp. *Marshii)*. This dwarf grass is currently known from three states—Idaho, Nevada, and California. It grows on high alpine rocky slopes in scree and talus (Soreng 1991). These sites have short growing seasons and the possibility of heavy frosts at any time of the year. One known location in the Salmon River Basin of Idaho occurs within the Pahsimeroi Sub-basin.

Alkali primrose *(Primula alcalina)*. This species is associated with wet, alkaline meadows; level benches adjacent to creeks or springs; and benches with hummocky topography, where they are found only on the tops and sides of the hummocks.

Wavy-leaf thelypody (*Thelypodium repandum)*. This mustard is endemic to Custer County in central Idaho. It inhabits steep shale banks derived from volcanic and metamorphic rocks where it is associated with bunchgrasses and herbaceous perennials across a wide elevational range (4,900 to 7,000 feet). It blooms from May through September (U.S. Forest Service 1990a).

Stanley thlaspi (*Thlaspi idahoense* var. *aileeniae)*. This mustard also is endemic to Custer County in central Idaho where it occurs on steep slopes on whitish sand among small rocks on sagebrush flats. It blooms from May to July (U.S. Forest Service 1990a).

Idaho range lichen (*Xanthoparmelia idahoensis)*. Nothing more is known about this species than the information given in Table 3-6.

TABLE 3-6
Special-Status Plant Species on the S-CNF or within Lemhi, Custer, Butte, and Blaine Counties[1]

		County Occurrence[2]						Status		
Scientific Name	**Common Name**	**Lemhi**	**Custer**	**Butte**	**Blaine**	**Habitat Association**	**Wetland Status[3, 4]**	**State (CDC)[5]**	**USFS (Region 4)**	**Federal**
Agoseris lackschewitzii	pink agoseris	**				Wet meadows with soil saturated through the growing season.	NI	S	S	
Allium anceps	two-headed onion			**		Heavy, barren soils of volcanic origin in swales, on flats, and slopes in the foothills and lowlands where water stands in the spring.		S2		
Antennaria arcuata	meadow pussytoes				**	Mesic natural grass-sedge meadow surrounded by sagebrush-steppe. Elevation 4,950 ft.	FACW	GP2		SC
Artemesia campestris ssp. *Borealis* var. *purshii*	northern sagewort		**			Open places, often in sandy soils.		S1		
Aster junciformis	rush aster		**			Fens, bogs, springs, and wet meadows; typically where the substrate remains saturated year-round.	OBL	S		
Astragalus amblytropis	Challis milkvetch	**	**			Volcanic ash deposits of lower sagebrush or shadescale-covered slopes.		GP3		
Astragalus amnis-amissi	Lost River milkvetch		**	**		Cracks in ledges of similar sites on near vertical limestone cliffs, and in talus at base of cliffs; mostly in moist shaded areas.		GP3	S	
Astragalus aquilonius	Lemhi milkvetch	**	**	**		Shale and gravel banks.		GP3	S	
Astagalus atratus var. *inseptus*	mourning milkvetch				**	Sagebrush slopes.		GP3		
Astragalus bisulcatus var. *bisulcatus*	two-groove milkvetch	**				Sagebrush desert and grasslands, often where alkaline.		S		
Astragalus diversifolius	meadow milkvetch	**	**	**		Moist, often alkaline soil.		GP2	S	

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Astragalus gilviflorus	plains milkvetch	**				Barren knolls, hilltops, and gullied badlands on limestone, shale, or sandstone.		S1		
Astragalus leptaleus	park milkvetch	**	**			Moist sedge-grass meadows, swales, and hummocks at edges of mountain brooks and among streamside willows.	OBL	M		
Astragalus oniciformis	Picabo milkvetch				**	Foothills of Sawtooth Mts.		GP3		
Astragalus paysonii	Payson's milkvetch		**			Burned and other open, disturbed sites between elevation 7,160 and 9,600 ft.		GP3	S	SC
Astragalus vexilliflexus var. *nubilus*	White Cloud's milkvetch		**			Dry open ridges in White Cloud Range.		GP2	S	
Botrychium campestre	prairie moonwort		**			Prairies, dunes, and fields over limestone. Elevation ,5000 ft.		S1		
Botrychium minganense	Mingan moonwort	**				Moist habitats in grand fir, subalpine fir, and lodgepole pine forest communities, as well as in brushfields.		S		
Botrychium simplex	least moonwort		**			Moist to dry meadows, bogs, swamps, roadside ditches, dry fields, and forests at middle elevations in the mountains.		S2		
Bouteloua gracilis	blue gramma	**				Shortgrass prairie habitat.		S1		
Camissonia pterosperma	winged-seed evening primrose			**		Desert shrub, sagebrush, and juniper communities.		S		
Carex breweri var. *paddoensis*	Brewer's sedge		**			Dry to wet soil or talus, near or above timberline.		S		
Carex buxbaumii	Buxbaum's sedge		**		**	Wet places such as streams, marshes, wet meadows, and peat bogs.	OBL	S		
Carex incurviformis var. *incurviformis*	maritime sedge		**			Alpine and subalpine moist tundra and wet rock ledges. Elevation 10,000 to 12,200 ft.		S2	S	

TABLE 3-6
Special-Status Plant Species on the S-CNF or within Lemhi, Custer, Butte, and Blaine Counties[1]

		County Occurrence[2]						Status		
Scientific Name	**Common Name**	**Lemhi**	**Custer**	**Butte**	**Blaine**	**Habitat Association**	**Wetland Status[3, 4]**	**State (CDC)[5]**	**USFS (Region 4)**	**Federal**
Carex livida	pale sedge	**	**			Bogs and fens, swampy woods, or sometimes on mineral substrates adjacent to slow-moving streams; from low to moderately high elevations.	OBL	S		
Carex parryana ssp. *Idahoa*	Idaho sedge	**				Meadows and moist, low ground, plains, and foothills.	FACW	GP2		
Carex straminiformis	Mt. Shasta sedge		**		**	Subalpine and alpine areas on open slopes often near persistent snowbanks.		S		
Castilleja pulchella	beautiful indian paintbrush	**			**	Elevation 9,000 to 11,500 ft.		GP3		
Catapyrenium congestum	lichen			**		Sandstone rocks, deep loamy soils in sagebrush, and salt desert shrub types.		S		
Chrysosplenium tetrandrum	northern golden-carpet	**				Riparian areas with dense over- and under-story canopy on moss-covered logs, rocks, and gravels adjacent to small streams and rivulets in spruce.	OBL	S1		
Cladonia luteoalba	reindeer lichen	**				Middle Fork of the Salmon River in very shady, sheltered, rocky, mid-elevation habitat. Grows on *Cladonia borealis*.		GP2		
Collomia debilis var. *camporum*	flexible alpine collomia	**				Talus slopes at high elevations.		GP3	S	
Coryphantha vivipara	cushion cactus	**				Desert valleys and foothills.		S		
Cymopterus douglassii	Douglass' wavewing	**	**			Alpine and subalpine areas on open slopes, ridges, and summits in calcareous or dolomitic substrates.		GP3	S	SC
Cymopterus ibapensis	Ibapah wavewing					Rocky, high-elevation sites in this region of Idaho (central mountains)			S	

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		County Occurrence[2]						Status		
Scientific Name	**Common Name**	**Lemhi**	**Custer**	**Butte**	**Blaine**	**Habitat Association**	**Wetland Status[3, 4]**	**State (CDC)[5]**	**USFS (Region 4)**	**Federal**
Cypripedium parviflorum var. *pubescens*	small yellow lady's slipper				**	Bogs, damp woods, and wet areas in thickets. Clay loam soils, with a thick litter layer.	FACW	S1		
Draba densifolia apiculata	rockcress draba					Moist, gravelly alpine meadows and talus slopes, often on limestone-derived soils.			S	
Draba fladnizensis	Arctic draba		**			Alpine tundra, above timberline on dry, rocky slopes.		S1		
Draba incerta	yellowstone draba	**	**		**	Subalpine and alpine areas on open slopes often near persistent snowbanks.		S		
Draba trichocarpa	Stanley whitlow-grass		**			Steep slopes on granitic parent material.		GP2	S	SC
Drosera intermedia	spoon-leaved sundew		**			Bogs, fens, and moist, acidic, sandy soils; often in standing water. Idaho populations occur in peatland habitats.	OBL (NAT'L)	S1		
Eatonella nivea	white eatonella	**	**			Dry, cindery, sandy, or volcanic desert areas, often with sagebrush. Also in dry washes in salt desert shrub.		S		
Epilobium paulstre	swamp willow-weed		**			Wet soil.	OBL	M		
Epipactis gigantea	giant helleborine	**	**			Moist areas such as springs, streambanks, seeps, and thermal sites.		S2		
Erigeron humilis	low fleabane	**	**	**		Talus and scree slopes above treeline.				
Erigeron salmonensis	Salmon River fleabane	**				Steep, north-facing rock faces, especially in moist areas or within the mist zone of waterfalls, usually on sites with granitic substrates.		GP3		SC
Eriogonum capistratum var. *welshii*	Welsh's buckwheat	**	**			Rocky volcanic slopes and gravelly clay or sedimentary barren flats with minimal vegetation consisting of scattered sagebrush and grasses.		GP2	S	

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		County Occurrence[2]						Status		
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Eriogonum meledonum	guardian buckwheat		**			Unstable scree slopes on granitic parent materials.		GP1	S	SC
Gentianella propinqua	four-parted gentian		**			Forests, meadows, along streambanks, on dry, open rocky slopes and as a calciphile in sedge tussocks in Arctic tundra.	FACW	M		
Gentianella tenella	slender gentian		**			Moist subalpine and alpine meadows.		S2		
Hackelia davisii	Davis' stickseed	**	**			Cliffs or talus near base of cliffs, generally below elevation 5,500 ft.		GP3		
Halimolobus perplexa var. *lemhiensis*	puzzling halimolobus					Granitic substrates in open ponderosa pine and Douglas-fir.		M	S	
Haploppus insecticruris	bugleg goldenweed				**	Sagebrush and grass meadow areas around elevation 5,000 to 6,000 ft.		GP3	S	SC
Helodium blandowii	Blandow's helodium moss	**	**			Organic soil in wet seeps or in dry meadows with sedge.		S		
Ipomopsis (Gilia) polycladon	spreading gilia			**		Desert shrub, sagebrush, and juniper communities, often on sandy soil.		S2		
Kobresia simpliciuscula	simple kobresia	**	**			Bogs and other wet places, montane, but generally not above timberline.	FAC	S2		
Lewisia kelloggii	Idaho bitterroot	**	**			Gravelly soil where moist in early spring, especially near snowbanks.		S1		
Lomatogonium rotatum	marsh felwort	**	**			Wet, often saline soil, montane.	OBL	S1		
Meesia longiseta	meesia moss	**				Immersed and emergent in eutrophic fens, swamps, and very wet sedge mats with areas of open water.		S1		
Mimulus clivicola	bank monkeyflower					Moist pockets of open mineral soil on south aspects.		M	S	

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Scientific Name	**Common Name**	**Lemhi**	**Custer**	**Butte**	**Blaine**	**Habitat Association**	**Wetland Status[3, 4]**	**State (CDC)[5]**	**USFS (Region 4)**	**Federal**
Orthotrichum hallii	moss		**	**		Fens and shady granitic rock outcrops.		S1		
Oxytropis besseyi var. *salmonensis*	Challis crazyweed		**			Sagebrush and salt desert shrub in sandy washes or open slopes of rocky volcanic soil.		GP3	S	
Papaver radicatum ssp. *Kluanense*	Arctic poppy	**				Very high elevation.		SX		
Parnassia kotzebuei var. *kotzebuei*	Kotzebue's grass-of-parnassus		**			Moist rock ledges, and crevices in subalpine and alpine zones.		M		
Penstemon lemhiensis	Lemhi penstemon	**				Grassland and open ponderosa pine forests between elevation 6,300 and 7,200 ft.		GP3	S	SC
Phacelia inconspicua	obscure scorpion plant			**	**	Rocky or bare, northerly facing slopes of sagebrush/grass. Loose soil rich in organic matter.		GP1		SC
Phacelia lyallii	Lyall's phacelia	**				Talus slopes and rock crevices at high elevations, often above timberline.		S		
Physaria didymocarpa var. *lyrata*	Salmon twin bladderpod	**				Rocky, sparsely vegetated, south slopes. Bare ground and rock coverage (1-3 inches rock).		GP1	S	SC
Poa abbreviata ssp. *Marshii*	Marsh's bluegrass		**	**	**	Alpine fell-fields.		GP2	S	
Polystichum kruckebergii	Kruckeberg's sword-fern		**			Cliff crevices and talus slopes, mid-montane upward to near timberline.		S		
Primula alcalina	alkali primrose	**	**			Wet, alkaline meadows; level benches adjacent to creeks or springs; benches with hummocky topography, where they are found only on the tops and sides of the hummocks.	OBL	GP1	S	SC
Ranunculus gelidus	Arctic buttercup		**			Talus slopes and in alpine meadows.		S1		
Ranunculus pygmaeus	pygmy buttercup		**			High, alpine meadows.		S		

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Special-Status Plant Species on the S-CNF or within Lemhi, Custer, Butte, and Blaine Counties[1]

		County Occurrence[2]						Status		
Scientific Name	**Common Name**	**Lemhi**	**Custer**	**Butte**	**Blaine**	**Habitat Association**	**Wetland Status[3, 4]**	**State (CDC)[5]**	**USFS (Region 4)**	**Federal**
Salix candida	hoary willow	**	**	**		Bogs, fens, marshes, pond edges, and seepage areas.	OBL	S		
Salix farriae	Farr's willow		**			Moist streamsides and lakeshores between elevation 9,000 and 9,300 ft.	OBL	S2		
Salix pseudomonticola	false mountain willow	**				Mid-montane to alpine.	FACW	S2		
Saxifraga adscendens var. *oregonensis*	wedge-leaf saxifrage		**		**	Alpine and subalpine areas on moist ledges and in rock crevices.		M		
Saxifraga cernua	nodding saxifrage		**	**	**	Moist rock crevices and gravelly meadows over elevation 10,000 ft.		S		
Scirpus rollandii	Rolland bulrush		**			Calcareous montane bogs. Elevation 6,600 ft.		GP3		
Sedum borschii	Borsch's stonecrop	**				Talus slopes and north slopes in the shade of Douglas-fir.		M		
Silene scaposa var. *lobata*	scapose silene			**		Sagebrush and pinyon-juniper.		M		
Silene uralensis ssp. *Montana*	petalless campion	**	**		**	Alpine tundra, talus slopes, riverbanks, and meadows.		S1		
Stylocline filaginea	stylocline				**	Open, dry, or vernally moist habitats in the valleys and foothills on shallow stony basalt with cindery, graveled surface. Associated with alkali sage, Owyhee sage, or stiff sage.		M		
Sullivantia hapemanii var. *hapemanii*	Hapeman's sullivantia	**				Hanging gardens; wet cliffs of various geology including lime-stone, shale, and quartzite.		GP3		SC
Thamnolia subuliformis	lichen	**				Exposed sandstone outcrop or rocky soils, south-facing slope.		S1		

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		County Occurrence[2]						Status		
Scientific Name	**Common Name**	**Lemhi**	**Custer**	**Butte**	**Blaine**	**Habitat Association**	**Wetland Status[3, 4]**	**State (CDC)[5]**	**USFS (Region 4)**	**Federal**
Thelypodium repandum	wavy-leaf thelypody	**	**			Moderate to steep, unstable, generally southerly facing slopes of rocky, gravelly to cindery substrate derived from Challis volcanic and metamorphic rock. Associated vegetation is sparse (5 to 20% cover), and bare ground coverage is high.		GP3	S	SC
Thlaspi idahoense var. *aileeniae*	Stanley thlaspi		**			Rocky, sandy flats with sagebrush or river gravel.		GP3	S	
Xanthoparmelia idahoensis	Idaho range lichen	**				Mountain rangelands of central Idaho in sagebrush.		GP2	S	

[1]These lists are subject to change as species are added, removed, or recategorized.

[2]** = Found in County

[3]Northwest Regional Indicator Status unless otherwise indicated

[4]NI–No Indicator Status; OBL–Obligate Wetland; FACW–Facultative Wetland; FAC–Facultative

[5]SX–State Extinct; S1–State Priority 1; S2–State Priority 2; S–State sensitive; M–State Monitor; GP1–Global Priority 1; GP2–Global Priority 2; GP3–Global Priority 3; SC–Species of Concern

Two additional Forest Service sensitive plant species of concern are described in the following text because they occur in habitats similar to habitats preferred by weeds. These are early successional (disturbance) species that may occupy habitat openings, particularly after fire. Appendix H shows their occurrence on the S-CNF by Ranger District and HUCs 4 and 5.

Payson's milkvetch (*Astragalus paysonii)*. Payson's milkvetch is a regional endemic known only from central and southeastern Idaho and southern Wyoming. This is a perennial species, which blooms July to August. It is a seral species that requires mineral soil (usually sandy soils with low cover of herbs and grasses) for establishment. These are the same conditions that generally favor weed invasion. Fire suppression (which is a factor in plant succession and canopy closure) may be decreasing the potential habitat for this species because it favors openings in stands of ponderosa pine, Douglas-fir, and sometimes lodgepole pine. All known locations of Payson's milkvetch are in disturbed areas, including recovering burns, clearcuts, trail edges, old skid trails, and road cuts.

After fires the potential for suitable habitat on the S-CNF for this species may increase. The characteristics of burn sites may give this species a higher potential for occurring in areas at risk from weed invasions.

Puzzling halimolobos (*Halimolobus perplexa* var. *lemhiensis).* This regional endemic occurs in central Idaho in Custer, Valley, and Lemhi Counties. Like Payson's milkvetch, it is a seral species requiring disturbance and bare soil to become established. It inhabits gravelly or sandy slopes, roadcuts, and dredge tailings with granitic substrates (U.S. Forest Service 1990a). It also occurs on grassy slopes adjacent to rock outcrops in open ponderosa pine and Douglas-fir forests (U.S. Forest Service 1999a). Many areas of potential habitat for puzzling halimolobos exist within the S-CNF with characteristics similar to those preferred by weeds.

2) Habitat Associations. Many of the sensitive plant species for the S-CNF that were described above and/or listed in Table 3-6 do not have broad habitat amplitude. Table 3-7 lists those species known to grow within specific habitats or to be associated with specific topographic parameters. Those species listed under the heading "early seral/disturbed sites" are likely to have the greatest potential for co-occurrence with noxious weeds because of the nature of these sites.

TABLE 3-7
Sensitive Plant Species Known to Grow Within Specific Habitats or Associated with Specific Topographic Parameters

Common Name	Scientific Name
Alpine	
Maritime sedge	*Carex incurviformis*
Rockcress draba	*Draba densifolia* var. *apiculata*
Marsh's bluegrass	*Poa abbreviata* ssp. *Marshii*
White Cloud's milkvetch	*Astragalus vexilliflexus* var. *nubilus*
Douglass' wavewing	*Cymopterus douglassii*
Welsh's buckwheat	*Eriogonum capistratum welshii*

TABLE 3-7
Sensitive Plant Species Known to Grow Within Specific Habitats or Associated with Specific Topographic Parameters

Common Name	Scientific Name
Wet Meadows	
Pink agoseris	*Agoseris lackschewitzii*
Meadow milkvetch	*Astragalus diversifolius* var. *diversifolius*
Ute ladies'-tresses	*Spiranthes diluvialis*
Alkali primrose	*Primula alcalina*
Talus/Scree Sites	
Lost River milkvetch	*Astragalus amnis-amissi*
Flexible alpine collomia	*Collomia debilis* var. *camporum*
Stanley whitlow-grass	*Draba trichocarpa*
Guardian buckwheat	*Eriogonum meledonum*
Wavy-leaf thelypody	*Thelypodium repandum*
Early Seral/Disturbed Sites	
Lemhi penstemon	*Penstemon lemhiensis*
Salmon twin bladderpod	*Physaria didymocarpa* var. *lyrata*
Lemhi milkvetch	*Astragalus aquilonius*
Payson's milkvetch	*Astragalus paysonii*
Puzzling halimolobos	*Halimolobos perplexa* var. *lemhiensis*
Marsh's bluegrass	*Poa abbreviata* ssp. *Marshii*

3.C.2. Aquatic Resources

a. Habitat Conditions and Threats

The watersheds within the S-CNF provide habitat for more than 20 fish species, including game and non-game species, endangered and threatened anadromous species, and threatened and sensitive resident species. These watersheds also support a variety of benthic invertebrates that are typically important fish foods, as well as several sensitive or rare species of frog, toad, and salamander that are associated with aquatic habitats. Noxious weeds have been shown to influence soil erosion and sedimentation (Lacey et al. 1989), which can adversely affect aquatic resources of the S-CNF. Forest and land management practices also may affect fish and their habitat. Excessive sedimentation can alter the streambed, affect spawning and rearing areas and success, and raise water temperatures, resulting in adverse effects to aquatic habitat quantity and quality and the well-being of fish and benthic invertebrate communities. Government agencies as well as private individuals have stocked fish in some streams and high mountain lakes of the S-CNF. Interbreeding between stocked fish and resident species affects the productivity and genetic integrity of some (primarily westslope cutthroat trout and bull trout) native fish populations (Quigley and Arbelbide 1997). In addition, stocked fish can adversely affect native fish species by successfully competing for food and space.

Corridors of the Salmon River and its major tributaries (the Pahsimeroi and Lemhi Rivers and their associated tributaries) are vulnerable to weed invasions. These systems provide important natural habitat conditions for fish and benthic organisms. They support migration, spawning, rearing, and overwintering by different life stages of anadromous species, and they provide year-round habitat for all life stages of resident species. The river corridors are subject to intense use by humans and wildlife. Human activities include diversion of water from the Salmon River watershed for livestock, agriculture, and community water use. Recreational activities like camping, fishing, and whitewater rafting are popular on nearly every stretch of these rivers. Mining, timber, and livestock grazing activities can also affect the quality of the habitat.

Generally, instream flows on the S-CNF adequately support healthy riparian communities and aquatic habitat. These flows are affected by human use (primarily irrigation) at lower elevations, sedimentation, and drought.

Roads confine many of the rivers and major streams on the S-CNF. These roads can contribute to the sedimentation of drainages and provide avenues for the proliferation of noxious weeds. Road construction has reduced riparian habitat, thus reducing the recruitment of wood into the stream channels that contribute to the formation of pools and provides cover for aquatic species. Conversion of some riparian areas to other uses further degrades habitat by removing native vegetation and replacing it with non-native grasses and other landscaping, thereby increasing an area's vulnerability to noxious weeds.

Weed control at or near the headwaters of rivers and tributaries on the S-CNF can have a direct beneficial downstream effect on riparian habitat and the health of aquatic resources by reducing seed dispersal and the threat of weed establishment. As noted previously (Lacey et al. 1989), noxious weeds have been shown to influence soil erosion and sedimentation, adversely affecting aquatic habitat and fish populations.

b. Special Status Species: Federally Listed Fish

The USFWS stated in their Section 7 consultation letter for the proposed project that four species of federally listed fish may occur within the S-CNF (see Appendix G). The USFWS identified these species as sockeye salmon, chinook salmon, steelhead, and bull trout. The federally listed representatives of these four species that may occur on the S-CNF are the Snake River sockeye salmon, Snake River spring/summer chinook salmon, Snake River steelhead, and bull trout. The sockeye salmon is listed as endangered and the other fish species are listed as threatened. In addition, the S-CNF contains designated critical habitat for Snake River sockeye salmon, designated critical habitat and Essential Fish Habitat (EFH) for Snake River spring/summer chinook salmon, and proposed designated critical habitat for bull trout. The salmon and steelhead are under the jurisdiction of the National Marine Fisheries Service (NMFS) and bull trout are under the jurisdiction of the USFWS. These lists are subject to change as species are added, removed, or recategorized.

The populations of these four species have been declining. Habitat degradation has been shown to play an important role in their decline. These species occur in habitats adjacent to areas that have been invaded by weeds or are potentially vulnerable to weed invasion, and could potentially be affected by the presence and/or treatment of noxious weeds. The four federally listed fish species are discussed in the following text and shown in Table 3-8.

Appendix H presents information on their occurrence on the S-CNF by Ranger District and HUCs 4 and 5.

TABLE 3-8
Threatened and Endangered Fish Species Under the ESA that may Potentially Occur within the S-CNF[1]

Common Name	Scientific Name	Habitat	Federal Status
Snake River sockeye salmon	*Oncorhynchus nerka*	Mountain lakes; low to mid-gradient creeks and rivers; range from high mountain spawning streams and lakes to Pacific Ocean; cold, clear, well-oxygenated water	E
Snake River spring/ summer chinook salmon	*Oncorhynchus tshawytscha*	Low to mid-gradient creeks and rivers; range from high mountain spawning streams to Pacific Ocean; cold, clear, well-oxygenated water	T
Snake River steelhead	*Oncorhynchus mykiss*	Low to mid-gradient creeks and rivers; range from high mountain spawning streams to Pacific Ocean; cold, clear, well-oxygenated water	T
Bull trout	*Salvelinus confluentus*	Large, woody debris; undercut banks, boulders, and pools; clean, cold, well-oxygenated water	T

E = endangered
T = threatened

[1]These lists are subject to change as species are added, removed, or recategorized.

Snake River Sockeye Salmon. This species was listed by NMFS as endangered on November 20, 1991, and today consists of a remnant population associated with Redfish Lake in the Upper Salmon River Basin in Idaho (56 FR 58619). Critical habitat for Snake River sockeye salmon was designated on December 28, 1993, and includes the Salmon River Basin from its confluence with the Snake River to five lakes in the Sawtooth National Recreation Area and all connecting corridors. Watersheds containing suitable spawning and rearing habitat for this species total approximately 510 square miles and lie partially or wholly within Blaine and Custer Counties (NMFS 2002).

Like other anadromous salmonids, sockeye salmon require habitat that includes four components: 1) spawning and juvenile rearing areas; 2) juvenile out-migration corridors; 3) areas for growth and development to sexual maturity; and 4) adult spawning migration corridors (58 FR 68543). Historically, this population of Snake River sockeye salmon migrated from the Pacific Ocean up the Columbia, Snake, and Salmon Rivers to Redfish Lake, then spawned in the lake's main tributary (Redfish Lake Creek). Juveniles reared for 2 years in Redfish Lake, then migrated to the ocean where they grew for 2 years and matured sexually before returning to spawn (Simpson and Wallace 1978).

Until recently, no more than eight adult sockeye salmon have returned annually to Redfish Lake to spawn. However, over the last few years from 30 to over 200 fish have returned primarily because of hatchery support (personal communication between Bob Rose, S-CNF, and Mel Hughes, Sawtooth Hatchery, June 1, 2002). Population declines have been attributed primarily to mainstem dams on the Columbia and Snake Rivers that have

blocked access to spawning and rearing areas and also caused mortalities to migrants (58 FR 68543; Quigley and Arbelbide 1997). A hatchery-based captive brood stock program on the Upper Salmon River has been in operation since 1984 in an attempt to prevent extinction of the Snake River sockeye salmon.

Snake River Spring/Summer Chinook Salmon. This species was listed by NMFS as threatened on April 22, 1992 (57 FR 34953). Critical habitat was designated on December 28, 1993, and revised on October 25, 1999. Within the S-CNF, critical habitat for the Snake River spring/summer chinook salmon includes all river reaches in the Salmon River Basin presently or historically accessible to natural populations of this species, except for stream reaches upstream of impassable natural falls (NMFS 2002b).

Pursuant to Section 305(b) of the Magnuson-Stevens Act and its implementing regulations, 50 CFR part 600.920, Federal agencies must consult with NMFS regarding any of their actions authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken that may adversely affect EFH. The Magnuson-Stevens Act, Section 3, defines EFH as "those waters and substrate necessary for fish for spawning, breeding, feeding, or growth to maturity." Based on this definition, EFH for Snake River spring/summer chinook salmon on the S-CNF would include all of those drainages on the S-CNF that have been designated as critical habitat for this species.

This species requires a variety of freshwater habitats for migrations, spawning, rearing, and overwintering, and marine habitats for growth to adulthood. Healthy riparian zones (with large woody overgrowth) also contribute to the essential freshwater habitat of this species (58 FR 68543), the same as for all salmonids. Adult spring/summer chinook salmon enter the Columbia River on spawning migrations to the Salmon River Basin from March through May. Spawning occurs during fall in clean large gravels and small cobbles with well-oxygenated water, often in the upper reaches of larger drainages or tributaries. Young emerge from gravels the following spring and rear for 1 year in freshwater ("stream-type" life history strategy) before outmigrating to the ocean. Adults usually spend 3 or 4 years at sea growing and maturing before returning to their natal streams to spawn (Simpson and Wallace 1978).

The Snake River spring-summer chinook salmon is one of the salmonids most at risk of those present on the S-CNF. Within the Columbia River Basin, stream-type chinook salmon populations are found only within 28 percent of their historic range (Quigley and Arbelbide 1997). Factors generally associated with impacted salmon populations include the effects of one or more of the following: hydroelectric dams on the Columbia and Snake Rivers; genetic introgression with hatchery fish; unproductive ocean conditions; degraded spawning substrate; warm water temperatures; predation by non-native fish on juvenile outmigrants, especially in mainstem reservoirs; reduced instream flows; and overharvest (USFWS et al. 2000).

Snake River Steelhead. This species is the inland anadromous form of rainbow trout. Wild steelhead stocks originating in the Snake River Basin (including the Salmon River Basin) were listed by NMFS as threatened on August 18, 1997 (62 FR 43937). Critical habitat for this species was designated on February 16, 2000, and includes drainages within the S-CNF (65 FR 7764). However, on April 30, 2002, the U.S. District Court approved a NMFS consent decree withdrawing the February 2000 critical habitat designation for the Snake River

steelhead evolutionarily significant unit (ESU) and 18 other steelhead and salmon ESUs, citing the need for a thorough analysis of economic impacts (NMFS 2003). NMFS anticipates re-issuing critical habitat designations for these ESUs after the economics analysis is complete.

As with other salmonids, essential features of critical habitat include: 1) substrate, 2) water quality, 3) water quantity, 4) water temperature, 5) water velocity, 6) cover/shelter, 7) food, 8) riparian vegetation, 9) space, and 10) safe passage conditions.

Like other anadromous species of the S-CNF, Snake River steelhead migrate up the Columbia, Snake, and Salmon Rivers and often spawn in upstream reaches of Salmon River tributaries. Adults enter freshwater between May and October (summer-run fish) and spawn the following spring. Young emerge from gravels during late spring to early summer and spend one or more years in freshwater before beginning downstream migrations to the ocean (Simpson and Wallace 1978).

Steelhead are widely distributed throughout waters of the S-CNF. Current populations occupy from 45 percent to 50 percent of watersheds within the basin. Steelhead populations have suffered declines from the same types of events and factors as listed for chinook salmon (Quigley and Arbelbide 1997).

Bull Trout. This species belongs to a sub-group of trout-like salmonids known as char. The Columbia River Basin bull trout was listed by the USFWS as threatened on June 10, 1998 (64 FR 58909). On November 1, 1999, the USFWS determined threatened status for all populations of bull trout within the contiguous (lower 48) U.S. (64 FR 58910). On November 29, 2002, Federal Register Notice 67 FR 71236 was published proposing designated critical habitat for bull trout, initiating the public comment period. The proposal included the Salmon River Basin and waters within the S-CNF. Bull trout can exhibit resident, fluvial (migrate between streams and larger rivers), or adfluvial (migrate between streams and lakes) life history strategies. Ideal habitat for bull trout includes clean cold waters with large woody debris, undercut banks, boulders, and deep pools (Quigley and Arbelbide 1997). Watersheds must have the specific physical characteristics to meet these habitat requirements for bull trout to successfully spawn and rear. Spawning usually occurs during late summer and early fall, often at sites of groundwater upwelling, with young emerging the following spring (USFWS et al. 2000).

One of the remaining core areas of bull trout distribution is the Salmon River watershed and mountains of Central Idaho. The distribution of bull trout populations is spotty, and generally occurs where habitat remains in good condition. The decline of this species has been attributed primarily to poor land management practices that contribute to degraded instream and riparian habitat conditions (Quigley and Arbelbide 1997).

c. Other Rare and Sensitive Aquatic Species

Westslope Cutthroat Trout. Westslope cutthroat trout is listed as a sensitive species by the Forest Service and as a priority species of special concern by the State of Idaho because of habitat degradation and declines of genetically pure populations (IDFG 2001). This species is widely distributed throughout the S-CNF (see Appendix H for distribution information by Ranger District and HUCs 4 and 5). However, like bull trout, it is largely dependent on high-quality habitat for survival, including cold water, numerous deep pools, and stream

beds that are relatively free of sediment (Quigley and Arbelbide 1997). The strongest populations of Westslope cutthroat trout occur in watersheds less influenced by roads or land management practices. Stocked non-native species of cutthroat and rainbow trout can also adversely affect Westslope cutthroat trout by hybridization. Migratory populations of this species are most significantly affected by the loss of viable habitat (Quigley and Arbelbide 1997).

Redband Trout. Redband trout *(Oncorhynchus mykiss)* is the native resident form of rainbow trout and is closely related to the anadromous variant (steelhead) of this species (Behnke 1992). Redband trout is listed as a priority species of special concern by the State of Idaho because of habitat degradation (IDFG 2001). This species spawns during spring and is generally more tolerant of higher water temperatures than either bull trout or Westslope cutthroat trout. Redband trout occupy a wide array of habitats throughout the S-CNF, and historically were widely distributed throughout the forest. This species displays a historic persistence even in heavily disturbed areas. However, relatively few strong populations exist today because of habitat segmentation and alteration, and hybridization with introduced species of hatchery-reared rainbow trout (Quigley and Arbelbide 1997).

Pacific Lamprey. This species (*Lampetra tridentata*) is a native anadromous lamprey. Like anadromous fish, this lamprey is believed to have historically migrated to all waters accessible to the more glamorous anadromous salmonids. They are a predacious parasite that feed off live fish. Lampreys require low gradient water with muddy bottoms, where young lampreys will burrow into the mud and consume microscopic plants. Returns of adults to the Snake River Basin have declined to less than a few hundred individuals. Because of this, the State of Idaho has listed Pacific lamprey as an endangered nongame species (IDFG 2001).

White Sturgeon. The Snake River population of this species (*Acipenser transmontanus*) has been identified by USFWS and the State of Idaho as a species of concern. It has been adversely affected by hydropower projects through migration barriers and population fragmentation (Quigley and Arbelbide 1997) and by overfishing (IDFG 2001). The Snake River population of white sturgeon occurs in the Snake River and in the mainstem Salmon River upstream to Clayton. This large, long-lived, bottom-oriented species is associated with large cool rivers (Simpson and Wallace 1978). It spawns in late spring/early summer over a rocky bottom in swift current near rapids. White sturgeon may not reach sexual maturity and spawn until 10 to 15 years of age. The largest sturgeon recorded from Idaho was a 1,500-pound fish caught in 1898 on a set line in the Snake River near Weiser (Simpson and Wallace 1978).

Columbia Spotted Frog. The Columbia spotted frog (*Rana luteiventris/R. pretiosa*) is a Forest Service sensitive species. It is highly aquatic and lives in or near permanent bodies of water, including lakes, ponds, slow streams, and marshes. It prefers areas with thick algae and sparse emergent vegetation, but sometimes hides under decaying vegetation. This frog is usually found in non-woody wetland habitats (sedges, rushes, and grasses). In the northern part of its range where snow and ice accumulate, spotted frogs are inactive during the winter and most hibernate and aestivate. The Columbia subspecies of the spotted frog is distributed over a wide range of altitudes, and in Washington has been found from approximately 1,700 to 3,100 feet above sea level (Leonard et al. 1993). There are many known occurrences of this species on the S-CNF (see Appendix H).

Western Toad. The western toad (*Bufo boreas*) occurs from the Rocky Mountains west to the Pacific Coast in a variety of natural habitats, such as desert streams, springs, seeps, grasslands, wooded areas, and mountain meadows. This species is mostly terrestrial, but it prefers to be near wet areas and most commonly occurs around marshes and small lakes, especially during breeding. During daylight hours, adult toads typically remain underground or in sheltered areas (Yeo and Peterson 1998). Western toads eat insects. They hibernate during winter months. There are several known occurrences of this Forest Service sensitive species on the S-CNF (see Appendix H).

Long-toed Salamander. This species (*Ambystoma macrodactylum*) occurs from southeastern Alaska to central California. In the Intermountain Region, it occurs as far east as the S-CNF. This salamander has a wide habitat breadth from semi-arid sagebrush-steppe to alpine meadows and high mountain lakes. It occurs at elevations ranging from sea level to 10,000 feet. It is usually found under logs, rocks, or other debris near water. The adults are subterranean except during the breeding season. In cold areas, the larvae may over-winter before transformation (Nussbaum et al. 1983). There are several known occurrences of this sensitive species on the S-CNF (see Appendix H).

d. Introduced Salmonids

Non-native salmonids have been introduced on the S-CNF since the late nineteenth century to enhance angling opportunities. Arctic grayling (*Thymallus arcticus*), golden trout (*Oncorhynchus aguabonita*), and lake trout (*Salvelinus namaycush*) have been introduced to the S-CNF to enhance angling opportunities in high mountain lakes. Brook trout (*Salvelinus fontinalis)* and rainbow trout (*O. mykiss)* have also been introduced to S-CNF lakes and streams. Although they have strong populations within the S-CNF, the latter two introduced salmonids pose risks of hybridization with native salmonids and compete for food and space.

e. Recreational Fisheries and Nongame Species

Although most fisheries surveys focus on the occurrence of species that are endangered, threatened, sensitive, or of concern (species listed under the ESA plus those so designated by the Forest Service and State of Idaho), a number of fish species provide recreational opportunities on the S-CNF. These include hatchery stocks of chinook salmon and steelhead, and rainbow trout, redband trout, brook trout, golden trout, Arctic grayling, lake trout, and mountain whitefish (*Prosopium williamsoni*). Hatchery-spawned, non-ESA steelhead that return to the Salmon River Basin as adults support a broad recreational fishing base within the basin, including areas within the S-CNF (Quigley and Arbelbide 1997).

Numerous S-CNF watershed analyses and sub-basin reviews prepared by the Forest Service, as well as the Idaho Fish and Game (IDFG 2001) Fisheries Management Plan for 2001 – 2006, reflect the importance, value, and widespread popularity of recreational fisheries on rivers, streams, and lakes throughout all Ranger Districts of the S-CNF. Drainages described in the IDFG Fisheries Management Plan that are contained entirely or in part within the S-CNF boundaries are the: Salmon River Drainage (Horse Creek to North Fork, North Fork to Headwaters, Middle Fork, East Fork, and Yankee Fork); Lemhi River Drainage; Pahsimeroi River Drainage; and the Sinks Drainages (Big Lost and Little Lost

Rivers, and Birch, Medicine Lodge, and Camas Creeks). Depending on the drainage and water body, fisheries on the S-CNF are managed for wild trout, put-and-take trout, a quality fishery, a trophy fishery, species conservation/preservation, and/or anadromous species.

Examples of commonly occurring nongame fish species that are important members of aquatic communities on the S-CNF include redshine shiner (*Richarsonius balteatus*), sculpin (*Cottus spp.)*, longnose sucker (*Catostomus catostomus*), and northern pikeminnow (*Ptychocheilus oregonensis*). These species, as well as all other fish species described above, may occur in habitats adjacent to areas that have been invaded by weeds or are potentially vulnerable to weed invasion. These stream and lake habitats could potentially be affected by the presence of noxious weeds and/or land management practices associated with noxious weed control.

f. Aquatic Management Indicator Species

Management Indicator Species (MIS) on the S-CNF are considered to be key species that represent life forms and have habitat requirements similar to other groups of plants or animals on the S-CNF. MIS are selected to represent special habitats, major habitat components of the S-CNF, economically or socially important species, ecological indicators, and monitoring capability. Aquatic MIS for the S-CNF consist of two anadromous and three resident fish species addressed previously (chinook salmon, steelhead, bull trout, Westslope cutthroat trout, and rainbow trout) that require high-quality habitat, and six taxonomic groups of aquatic macroinvertebrates (U.S. Forest Service 1987a; 1988a). The macroinvertebrates include three genera of mayflys (*Rhithrogena* spp., *Epeorus* spp., and *Ephemerella doddsi*) whose abundance indicates high water quality; one genera of stonefly (*Zapada* spp.) whose abundance generally indicates healthy riparian zones; one species of mayfly (*Ephemerella inermis*) whose abundance may indicate increased sedimentation; and members of the family Chironomidae (midges) whose abundance may indicate habitat degradation.

3.C.3. Wildlife Resources

a. Habitat Conditions and Threats

The S-CNF hosts a wide variety of wildlife, primarily resulting from the diversity of habitats and climatic variations. Public lands on the S-CNF provide year-round habitat for large ungulates like elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), bighorn sheep (*Ovis canadensis*), mountain goats (*Oreamnos americanus*), pronghorn antelope (*Antilocarpa americana*), and moose (*Alces alces*). Predators like mountain lions (*Felis concolor*), black bears (*Ursus americanus*), coyotes (*Canis latrans*), and gray wolves (*Canis lupus*) also roam the S-CNF. Upland game birds are also present on the S-CNF. Wetlands and riparian-dependent species are present in the lower valleys; beaver, amphibians, and wading birds use these areas. Many species of migratory birds spend vital nesting/reproduction time on the S-CNF.

Noxious weed invasion has affected to some extent the following habitats:

- The sagebrush/grass series supports the large ungulates (especially during winter as key winter range) and game birds like chukar (*Alectoris chukar*) and sage grouse. This habitat also plays an important role in the reproductive success of large ungulates,

especially of ewe/lamb bands in more rocky portions of the S-CNF. Road densities in this habitat are high, and generally contribute to a higher occurrence of noxious weeds. Private agricultural developments have converted portions of these grasslands to irrigated pastures and fields, reducing native habitat and increasing the probability of noxious weed invasion.

- Low-elevation ponderosa pine and Douglas-fir communities form a major portion of the S-CNF available as big game winter forage. Perennial grasses, forbs, and shrubs form a major part of this forage, and are more vulnerable to weed invasions. Blue grouse (*Dendragpus obscurus*) prefer the pine communities for nesting and spring/summer forage. These habitat communities also provide important elk and deer birthing and rearing areas. Black bear use the habitat for forage. These pine communities provide vital habitat for a diverse array of small mammals and birds ranging from American marten (*Martes americana*) to raptors. Road density and recreational use in these communities are high, contributing to the spread of noxious weeds.
- Riparian communities provide habitat for various wildlife species ranging from nesting songbirds to elk cow/calf summering bands. These communities provide structural diversity, particularly when interspersed within pine and grassland communities. Their occurrence at most elevations within the S-CNF provides essential vertical diversity. Big game, beaver, waterfowl, amphibians, and wading birds all rely on this habitat type. The ecological importance and vulnerability of these communities cannot be overstated. Noxious weeds spread aggressively in such areas.

Wildlife habitats, such as alpine meadows and cold forest types such as Douglas-fir-, lodgepole pine, and white bark pine, also occur in higher elevations of the S-CNF, but they are not as vulnerable to noxious weed invasions. Roadless areas of the S-CNF extend throughout all habitats, but are less vulnerable to the spread of noxious weeds due to minimal access opportunities and nominal ground disturbance.

b. Special Status Species: Federally Listed Wildlife

The USFWS initially provided a list of nine threatened, endangered, and candidate fish and wildlife species that may spend all or part of each year on the S-CNF. These species are given special consideration and protection under Section 7(c) of the ESA of 1973. The USFWS provided subsequent consultation (see Appendix G) stating that one of the five wildlife species, grizzly bear, is no longer listed as threatened on the S-CNF. This section reviews the habitat requirements and distribution of the four federally protected terrestrial wildlife species listed in Table 3-9. Appendix H presents information on their distribution on the S-CNF by Ranger District and HUCs 4 and 5. The four federally protected fish species were reviewed in *Section 3.C.2, Aquatic Resources.* These lists are subject to change as species are added, removed, or recategorized.

Bald Eagle. This species was federally listed as threatened on March 11, 1967. This species' status was reclassified from endangered to threatened because of recovery progress on July 12, 1995. Bald eagles (*Haliaeetus leucocephalus*) are closely associated with lakes and large rivers in open areas, forests, and mountains. They nest near open water in late-successional forest with many perches or nest sites, and low levels of human disturbance (McGarigal 1988; Wright and Escano 1986). The nest site is usually within one quarter to 1 mile of open

water with less than five percent of the shore developed within 1 mile. Perches are generally at the edge of forest stands, near foraging areas, or near the nest tree and have panoramic views of surrounding areas. Bald eagles need large trees along rivers with good visibility, preferably snags, but also use trees or boulders for perching. Protected deep ravines with large trees are often used as night roosts. The food base is largely aquatic species (fish) and riparian/wetland dwelling birds. Carrion and small terrestrial mammals are also utilized.

Critical winter habitat is near food sources, such as lakes, rivers, and uplands with big game winter range. These sites have adequate perch sites and sheltered roost sites. Human activity may be a major factor limiting bald eagle distribution in wintering habitats (Steenhof 1976).

Yellow-billed cuckoo. In July 2001, the USFWS announced a 12-month finding for a petition to list the yellow-billed cuckoo (*Coccyzus americanus*) as threatened or endangered in the western U.S. A petition to list this species was filed in 1998. The petitioners stated that "habitat loss, overgrazing, tamarisk invasion of riparian areas, river management, logging, and pesticides have caused declines in yellow-billed cuckoo." In the 90-day finding published on February 17, 2000 (Federal Register 65[33]: 8104-8107), the USFWS indicated that these factors may have caused loss, degradation, and fragmentation of riparian habitat in the western U.S., and that loss of wintering habitat may be affecting the cuckoo. The yellow-billed cuckoo is a candidate species for protection under the ESA.

This secretive bird is a neotropical species that breeds in North America and winters primarily south of the U.S.-Mexico border. It once flourished in western cottonwood and willow riparian forests and thickets, but is now nearly extinct west of the Continental Divide, where it has disappeared from large portions of its former range and is extremely rare in the interior West. Most Idaho records are of isolated, non-breeding individuals (USFWS 1985). Although occasional reports of this bird are noted, including several birds at Lawyers Creek in Lewis County in 1979 and six at the Cartier Wildlife Management Area in 1980, and an observation of a single adult bird made south of Challis, Idaho along the Salmon River in 1998, no nesting attempts or young have been observed and breeding populations of yellow-billed cuckoos in Idaho are believed to be extirpated (Reese and Melquist 1985).

This species may go unnoticed because it is slow-moving and prefers dense vegetation. In the West, it favors areas with a dense understory of willow (*Salix* spp.) combined with mature cottonwoods, generally within 100 meters of slow or standing water (Gaines 1974; Gaines 1977; Gaines and Laymon 1984). The yellow-billed cuckoo is also known to use non-riparian, dense vegetation such as wooded parks, cemeteries, farmsteads, tree islands, Great Basin shrub-steppe, and high elevation willow thickets (Finch 1992; DeGraaf et al. 1991). It feeds on insects, mostly caterpillars, but also beetles, fall webworms, cicadas, and fruit (especially berries). Populations seem to fluctuate dramatically in response to fluctuations in caterpillar abundance. These fluctuations are erratic, but not necessarily cyclic (Kingery 1981).

Gray Wolf. This species was federally listed as endangered on March 11, 1967. The wolf was considered extirpated from the western portion of the conterminous U.S. by about 1930. The gray wolf (*Canis lupus)* historically ranged over most of North America north of Mexico City, except for the southeastern U.S. The gray wolf occurred historically in the northern

Rocky Mountains, including mountainous portions of Wyoming, Montana, and Idaho. For 50 years prior to 1986, no detection of wolf reproduction was found in the Rocky Mountain portion of the U.S. Reproducing wolf populations were not known to occur in Idaho. Wolves were occasionally sighted in Idaho, but did not constitute a population as defined by scientific experts (USFWS 1994). On November 18, 1994, the USFWS announced that "experimental non-essential" populations of this species would be reintroduced in central Idaho and southwestern Montana. Populations classified as "experimental non-essential" are exempt from full endangered status (USFWS 1994). This status designation allows for "flexible management" options for this species in areas allocated for reintroductions.

The gray wolf has no particular habitat preference, but requires areas with low human population, low road density, and high prey density, which are ideally large, wild ungulates (Burt and Grossenheider 1980; Bjorge and Gunson 1989; Fisher et al. 1998; Mech 1989).

There are three recovery areas designated by the USFWS: the Northwestern Montana Recovery Area, the Greater Yellowstone Recovery Area, and the Central Idaho Recovery Area. The Central Idaho Recovery Area wolf population is managed and monitored by the Nez Perce Tribe. In January, 1995, 15 animals were released and in January, 1996, 20 more were released in the FCRONRW. Several on-going research projects in or near the S-CNF are looking at wolf-cougar and wolf-livestock interactions. These introduced wolves have established several viable packs throughout the S-CNF, except in the Lost River and Leadore Ranger Districts.

TABLE 3-9
Endangered, Threatened, and Candidate Wildlife Species Under the ESA that may Potentially Occur within the S-CNF[1]

Common Name	Scientific Name	Habitat	Federal Status
Birds			
Bald Eagle	*Haliaeetus leucocephalus*	Relative solitude, late-successional forests, shorelines adjacent to open water, a large prey base for successful brood rearing, and large, mature trees for nesting and resting.	T
Yellow-billed cuckoo	*Coccyzus americanus occidentalis*	Riparian woodlands, thickets, and farms.	C
Mammals			
Gray wolf	*Canis lupus*	Adapted to many habitats, need large ungulate prey base and freedom from human influence.	E/XN
Canada lynx	*Felis lynx canadensis*	Requires foraging habitat, denning sites, and dispersal and travel cover.	T

T = threatened
C = candidate
E/XN = Endangered/ experimental, non-essential population
[1]These lists are subject to change as species are added, removed, or recategorized.

Canada Lynx. The Canada lynx (*Felis lynx canadensis*) was federally listed as threatened on March 24, 2000. In the contiguous U.S., the distribution of lynx is associated with the southern boreal forest, consisting of subalpine coniferous forest in the West and primarily

mixed coniferous/deciduous forest in the East (Aubry et al. 1999). In Canada and Alaska, lynx habitat is the classic boreal forest ecosystem known as the taiga (McCord and Cardoza 1982; Quinn and Parker 1987; Ruggiero et al. 1999). Within these general forest types, lynx are most likely to persist in areas that receive deep snow, for which the lynx is highly adapted (Ruggiero et al. 1999).

According to the Forest Service (1993), lynx in the southern extension of their range require three primary habitat components: 1) foraging habitat (15- to 35-year-old lodgepole pine to support snowshoe hare, the primary food source, and provide hunting cover; 2) denning sites with patches of spruce and fir greater than 200 years old that provide abundant large woody debris; and 3) dispersal and travel cover that is variable in vegetative composition and structure. Abundance of snowshoe hare is the limiting factor for lynx (Koehler 1990; Reichel et al. 1992). Snowshoe hare distribution is limited by the availability of winter habitat that includes early successional lodgepole pine with trees that exceed the mean snow depths and provide snow interception and are interlocking canopy above the snow. Lynx dens are primarily located in mature lodgepole pine and spruce-fir forests (Koehler and Brittell 1990).

When the Canada lynx was federally listed as threatened, the USFWS concluded that the chief threat to the lynx in the contiguous U.S. was the "lack of guidance to conserve the species" in federal land management plans. In February 2000, the Forest Service and USFWS signed a Lynx Conservation Agreement to implement the management standards contained in the Lynx Conservation Assessment Strategy (LCAS) and thus to promote the conservation of lynx and its habitat. The LCAS was prepared by a group of inter-agency biologists and provides detailed descriptions of lynx habitat, potential risk factors affecting lynx, and potential conservation measures. The Forest Service and BLM are jointly preparing an EIS on a proposal to implement management direction contained in the LCAS for Canada lynx habitat on national forests and BLM units within the Northern Rocky Mountain area. The proposal would amend 18 land and resource management plans for national forests in Idaho, Montana, Utah, and Wyoming, and 18 BLM land use plans in Idaho and Utah.

c. Other Sensitive Wildlife Species

In addition to the federally listed species described above, the Forest Service Region 4 sensitive wildlife species list includes: spotted bat (*Euderma maculatum*), Townsend's big-eared bat (*Corynorhinus townsendii)*, fisher (*Martes pennanti*), wolverine (*Gulo gulo*), boreal owl (*Aegolius funereus*), flammulated owl (*Otus flammeolus*), great gray owl (*Strix nebulosa*), northern goshawk (*Accipiter gentilis*), three-toed woodpecker (*Picoides tridactylus*), harlequin duck (*Histrionicus histrionicus*), and peregrine falcon (*Falco peregrinus*). The two other Forest Service sensitive species occurring on the S-CNF—Westslope cutthroat trout and Columbia spotted frog—were discussed under *Section 3.C.2, Aquatic Resources*. Although not a Forest Service Region 4 sensitive species, sage grouse (*Centrocercus urophasianus)* are also discussed in the following text because of their severely declining numbers in the Intermountain West. Appendix H presents information on the locations of these species on the S-CNF by Ranger District and HUCs 4 and 5. These lists are subject to change as species are added, removed, or recategorized.

Spotted Bat. The spotted bat is very uncommon in central Idaho, but is distributed across a wide range of habitats in the western mountain region from desert scrub to open ponderosa pine forests. This species usually occurs in rough, rocky, semi-arid to arid landscapes and roosts in cliff faces and rock crevices (Genter and Jurist 1995). This species is solitary in nature, and the female bears one young each year in late spring. Its diet consists almost exclusively of medium-sized moths, beetles, and caddisflies. Foraging has been observed in forest openings, particularly ponderosa pine forests, pinyon juniper woodlands, large riverine/riparian habitats, riparian habitat associated with small to mid-sized streams in narrow canyons, wetlands, meadows, and old agricultural fields. In Idaho, populations occur in the central and southwestern corner of the state (Doering and Keller 1998; Wenger, personal communication). One unvouchered record for the Salmon River in Nez Perce County exists, and a juvenile was caught and released during a mist net survey in the Middle Fork of the Salmon River in 1998. Two vouchered specimens have been collected in Idaho; the remaining records are from acoustic recordings.

Townsend's Big-eared Bat. This bat inhabits a variety of habitats from desert shrub to deciduous and coniferous forests at a wide range of elevations. In Idaho, some individuals likely migrate to hibernal sites to overwinter and disperse to forested areas during summer when the sexes separate (Pierson et al. 1999). Other individuals found near Lake Pend Oreille seem to use the same mine during both summer and winter. In Lemhi County, this species has been captured in numerous mist net and harp trap surveys of abandoned mine adits. Hollow cavities in large trees or snags may constitute an important undocumented resource for maternity colonies of this species. Their diet consists mainly of moths in the family Noctuidae with lesser amounts of beetles, flies, and other insects.

Fisher. In the Pacific Northwest, the distribution of this species coincides with the habitat occupied by snowshoe hares, especially Douglas-fir forests. Fishers are generalized predators that eat a wide variety of birds, mammals, fruit, and carrion. The fisher is known as a predator of porcupines, but snowshoe hares are the most common prey (Ingles 1965; Powell and Zielinski 1994). Fishers avoid non-forested areas, especially in winter (Coulter 1966; Earle 1978; Jones 1991; Jones and Garton 1994; Kelly 1977). In the S-CNF, this species has been noted in the Pistol Lake area and the North Fork of the Salmon River drainage.

Wolverine. This rare mammal is distributed circumpolarly from the 38th parallel north, with populations in the Colorado Rocky Mountains and California Sierra Nevada dropping below this latitude (Banci 1994). This species (*Gulo gulo*) feeds on small animals, snowshoe hare, porcupines, and marmots, as well as on carrion. They are found in inaccessible areas of mountain ranges in central Idaho and are believed to be distributed mainly in the Selkirk Mountains and the Sawtooth Mountain-Smokey Mountain complex (Groves 1988), but are also known to occur in the Salmon River Mountains and the Beaverhead Mountains.

Boreal Owl. This owl inhabits spruce-fir forests in Montana, Idaho, and northern Wyoming (Hayward et al. 1993). They require cavities for nesting and feed primarily on small mammals, especially southern red-backed voles (*Clethrionomys gapperi*). Spruce-fir is the preferred species but cavities have been found in Douglas-fir, lodgepole, aspen, and high elevation ponderosa pine (Hayward and Verner 1994). Boreal owls inhabit mature and older forest stands and need forest management and timber harvest systems that will retain snags and forest structure. Boreal owls are present within the North Fork and Salmon/Cobalt Ranger Districts.

Flammulated Owl. This tiny, insectivorous owl is a neotropical migrant that breeds in the mountains of the western U.S. and winters in the Southwest U.S., Mexico, and Central America. Summer breeding sites are mainly in ponderosa pine and Jeffrey pine (*Pinus jeffreyi*) (Verner 1994). Preferred nesting sites are in forests with old ponderosa pine mixed with Douglas-fir (Linkhart et al. 1998). This owl is known to breed in several areas on the S-CNF in mature ponderosa pine and Douglas-fir forest.

Great Gray Owl. This owl builds open nests in large trees in heavy forest canopy (Bull and Henjum 1990). They forage in more open forest sites with heavy grass ground cover, where they perch in snags or live trees to hunt. They prey upon relatively small prey, mostly small rodents such as voles (*Microtus* spp.) (Duncan and Hayward 1994). This owl has been found at higher elevations throughout the S-CNF.

Northern Goshawk. This accipiter is a forest habitat generalist that uses a variety of forest types, ages, structural conditions, and successional stages. It feeds on birds and small mammals (Johnsgaard 1990; Reynolds et al. 1992). During nesting, goshawks select mature forest consisting of a combination of old, tall trees with intermediate canopy coverage and small open areas within the forest for foraging. This species occurs in many areas on the S-CNF, such as the Salmon River Mountains and the Lemhi Mountains.

Three-toed Woodpecker. This woodpecker eats predominantly insects. Approximately 75 percent of its diet is insects such as wood-boring beetles, grubs, weevils, ants, other beetles, and spiders. Besides insects, it also feeds on berries and other small fruits, acorns, and nuts (Stokes and Stokes 1996). It often forages on fire-killed trees for insects (Hutto 1995). Post-fire conditions are important to this species for both feeding and nesting purposes. This species is known to utilize burned areas across the S-CNF.

Harlequin Duck. This sea duck, which winters along both coasts, breeds along inland streams. On the West coast, this species breeds and summers inland from the coastal mountains of Alaska to California, and along the northern Rocky Mountains to Yellowstone (Bellrose 1980). This riparian species prefers stretches of streams with mature and old growth forests. Aquatic insect larvae are the preferred diet for juveniles and for adults during the breeding season (Cassirer and Groves 1994). In Idaho, nest sites include cavities in trees and cliff faces (Cassirer et al. 1993). Adult females show fidelity to nest sites, but radio-tagged harlequins have used new nest sites after a nest failure the previous year (Cassirer et al. 1993; Wallen and Groves 1989). This species is only known to occur on the S-CNF during seasonal migrations.

Peregrine Falcon. Populations of this bird were considered to have sufficiently recovered so that the USFWS removed it from the Endangered Species List on August 20, 1999. This falcon feeds on a variety of smaller birds, often associated with riparian habitats, that are usually captured on-the-wing. This species nests mainly on cliffs, rarely in trees, and usually near water. Breeding peregrine falcons are most likely to be disturbed by activities taking place near their nest (Herbert and Herbert 1969; Ellis 1982). This species is known to nest in Lemhi County but not on the S-CNF.

Sage grouse. Sage grouse (*Centrocercus urophasianus)* are linked to sagebrush habitats. They prefer relatively tall sagebrush for nesting areas and open sites for lekking areas. Hens usually nest near the lekking grounds, but some are known to move as far as 20 miles to

preferred nesting and brood-rearing sites (Call 1979). Studies indicate preferred nesting and brooding sites have a selection of native forbs and grasses in the understory as well as a sagebrush overstory (Barnett 1993; Barnett and Crawford 1994; Connelly et al. 1991; Drut et al. 1994a; Drut et al. 1994b; Gregg 1992; Gregg et al. 1993; Ramsey et al. 1994). A special habitat feature for sage grouse during the brood-rearing period is riparian vegetation, especially wet meadows with forbs. Native forbs provide spring and summer food for hens and broods (Autenreith et al. 1982; Call 1979; Oakleaf 1971; Peterson 1970; Robertsons 1986; Savage 1969; Wallestad et al. 1975).

The dependence of sage grouse on sagebrush for winter habitat has been well documented (Eng and Schladweiler 1972; Beck 1975; Beck 1977; Robertson 1991). Similarly, the relationship between sagebrush habitats and sage grouse nest success has been described thoroughly (Klebenow 1969, Wallestad and Pyrah 1974, Wakkinen 1990, Connelly et al. 1991, Gregg et al. 1994). Populations may have: 1) distinct winter, breeding, and summer areas; 2) distinct summer areas and integrated winter and breeding areas; 3) distinct winter areas and integrated breeding and summer areas; or 4) well-integrated seasonal habitats (non-migratory populations). Seasonal movements between distinct seasonal ranges may exceed 75 km (DaIke et al. 1963, Connelly et al. 1988). Sage grouse tend to winter in low to mid-elevational, relatively flat, sagebrush areas (Eng and Schladweiler 1972; Rogers 1964). There are no known lekking grounds on the S-CNF, but there are areas of potential nesting and brood rearing habitat, although no confirmed sites. Observations of adult sage grouse, either singly or in small flocks, are common occurrences in the late fall and winter on the S-CNF.

d. Wildlife Management Indicator Species (MIS) Minimum Viable Populations and Anticipated Area of Suitable Habitat

Wildlife MIS on the S-CNF consist of 20 species, represented by four big game, two small mammal, eight songbird, two raptor, and four threatened, endangered, or sensitive wildlife species (U.S. Forest Service 1987a; 1988a). Some of these species were addressed previously, including bald eagle, gray wolf, grizzly bear, northern goshawk, great gray owl, and peregrine falcon. Other wildlife MIS on the S-CNF include elk, mule deer, bighorn sheep, mountain goat (*Oreamnos americanus*), American marten, pileated woodpecker (*Dryocopus pileatus*), vesper sparrow (*Pooecetes gramineus*), yellow warbler (*Dendroica petechia*), ruby-crowned kinglet (*Regulus calendula*), yellow-bellied sapsucker (*Sphyrapicus nuchalis)*, pygmy nuthatch (*Sitta pygmaea*), brown creeper (*Certhia americana*), mountain bluebird (*Sialia currucoides*), and red squirrel (*Tamiasciurus hudsonicus*). The mountain bluebird and red squirrel were not specifically addressed by Wisdom et al. (2000) as broad-scale species of focus. They have been added to and discussed below with wildlife groups 29 and 6, respectively, based on their habitat preferences.

1) MIS Minimum Viable Population and Habitat Requirements. The Forest Service (1987a) reported that existing populations and habitat required for each MIS wildlife species exceeded minimum viable levels, with the following exceptions. Mountain goat and yellow-bellied sapsucker were at minimum viable levels, and at that time bald eagle, peregrine falcon, gray wolf, and grizzly bear populations were at less than viable levels. These and other S-CNF wildlife species are discussed in the following text.

Existing data from the Salmon National Forest Land and Resource Management Plan (Salmon Plan) (U. S. Forest Service 1988a) were used to estimate the minimum viable populations (MVP) and the corresponding areas of required suitable habitat for MIS on the former Salmon National Forest portion of the S-CNF (Table 3-10). The Salmon Plan includes estimates for MVPs and the area of suitable habitat required to support these MVP levels on the entire Salmon National Forest, including the FCRONRW. The Salmon Plan also includes estimates of the amount of suitable habitat present for each MIS within the Salmon National Forest. These numbers have been adjusted downward by 26 percent in Table 3-10, equal to the portion of the Salmon National Forest within the FCRONRW, because this Final EIS does not cover the wilderness. A blanket reduction in these estimates proportional to the portion of the Forest that is within the wilderness and not considered in this Final EIS requires an assumption that the relative amount of suitable habitat for each MIS is similar on both the wilderness and non-wilderness portions of the Forest. Given the juxtaposition of the wilderness and non-wilderness and the similar range of elevations, this appears to be a reasonable assumption.

Specific approaches used by the USFS to estimate MIS populations and the corresponding areas of required suitable habitat in the Salmon Plan are described below. The text regarding species is taken directly from the Salmon Plan and refers to 1988 MVP and required habitat levels:

Big Game

These levels are considered to be minimum numbers that the population could be reduced to yet still not permanently alter the distribution pattern or gene pool. With the exception of mountain goats, this level ranges from approximately one-quarter to one-third of the existing level. Mountain goat populations are at approximately this level now (1988).

T&E Species

These are theoretical minimum levels needed to bolster existing populations to a level where they could be self sustaining on the Salmon National Forest. The existing (1988) situation for all species is below MVP levels.

Other Species

(MVP) Population levels were judged to be met by maintenance of minimum levels of major critical habitat, i.e., old growth timber, quaking aspen, sagebrush, and riparian zones, as well as minimum snag levels.

2) Estimated 1988 Population Levels and Areas of Suitable Habitat for MIS. The Salmon Plan also presented estimates of MIS populations and areas of suitable habitat on the entire former Salmon National Forest as of 1988. As above, these Forest-wide estimates have been revised downward by 26 percent to account for the fact that the FCRONRW is not considered in this Final EIS and the same assumptions apply. The revised MIS population and habitat estimates are also presented in Table 3-10. Specific approaches used by the USFS to estimate MIS populations and suitable habitat in the Salmon Plan is described below. The text regarding species is taken directly from the Salmon Plan and refers to 1988 population levels and habitat area:

Big Game

Existing population levels are sustained by available forage from National Forest and BLM winter range, and from National Forest summer range (both Salmon National Forest and adjacent National Forests). This includes existing (1988) levels of wildlife and livestock competition, and existing levels of open roads.

T&E Species

The existing (1988) levels are estimates of numbers felt to be occupying the Forest. This is considered to be below MVP for all species.

Other Species

Existing (1988) levels are estimates of animals actually present on the Salmon National Forest, based on local data where available, or the most reliable research from similar areas.

3) Anticipated Acres of Suitable Habitat for MIS Species on the S-CNF. The Land and Resource Management Plan for the Challis National Forest (U. S. Forest Service 1987c) includes estimates of the acres of suitable habitat for the four MIS (all big game species) on the Challis portion of the S-CNF. These estimates for elk, mule deer, bighorn sheep, and mountain goats have been adjusted downward because the FCRONRW is not considered in this Final EIS, and then added to the acres of anticipated suitable habitat on the Salmon National Forest to obtain an overall estimate of acres of suitable habitat for these four MIS on the S-CNF (Table 3-10, last column). The rest of the S-CNF MIS listed in Table 3-10 were not MIS for the former Challis National Forest.

Table 3-10 also notes the source habitats required by all of the S-CNF MIS, as described by Wisdom et al. (2000), and indicates the broad PVGs that likely include each of the source habitats. However, there are no direct correlations between source habitats and potential vegetation groups because source habitats are very specific while potential vegetation groups are very broad. Therefore, it is not possible to directly estimate the number of acres of suitable source habitats for the other MIS on the former Challis National Forest portion of the S-CNF based on acres of the potential vegetation groups present, which are the only available data.

Estimates of the number of acres of suitable habitat for each of the S-CNF MIS, besides the four big game species, were derived as follows. The former Salmon and Challis National Forests are both located within the Central Idaho Mountains Ecological Reporting Unit (ERU) as defined by Wisdom et al. (2000). ERUs are subdivisions of the Interior Columbia Basin Ecosystem Management Project area constructed to facilitate common reporting of ecological assessment results at a broad level. Areas within a particular ERU are assumed to be similar in terms of the types of source habitats present for specific wildlife species. Given their inclusion within a single ERU and the juxtaposition and the similar range of elevations of the lands within the former Salmon and Challis National Forests, it was assumed that the two Forests included similar source habitats and that the relative amount of each source habitat was similar on the two Forests. For example, the source habitat for the ruby-crowned kinglet was estimated to represent 12 percent of the area of the Salmon National Forest (U. S. Forest Service 1988a). Therefore, it was assumed that 12 percent of the Challis National Forest outside of the FCRONRW also was suitable ruby-crowned kinglet habitat.

Estimates of the area of suitable habitat for the remaining MIS for the Salmon and Challis National Forests were then combined and reported in Table 3-10.

TABLE 3-10
Management Indicator Species Estimated Minimum Viable Populations (MVP) and 1988 Population Levels on the Former Salmon National Forest and Anticipated Acres of Suitable Habitat on the S-CNF, excluding the FCRONRW.

Management Indicator Species	Estimated MVP on SNF and Required Habitat Acres (nearest 100 ac)[1]	Estimated Population and Acres of Suitable Habitat on SNF in 1988 (nearest 100 ac)[1]	Source Habitat Type	Potential Vegetation Groups	Anticipated Acres of Suitable Habitat on the S-CNF
Elk	1,110 (784,400 ac)	4,070 (1,307,600 ac)	Forest / range mosaic	All PVGs on S-CNF (see Table 3-13)	1,780,264
Mule deer	3,700 (740,000 ac)	16,058 (1,307,600 ac)	Forest / range mosaic	All PVGs on S-CNF(see Table 3-13)	2,092,857
Bighorn sheep	241 (185,000 ac)	740 (360,00 ac)	Forest / range mosaic	All PVGs on S-CNF(see Table 3-13)	672,283
Mountain goat	222 (227,200 ac)	222 (227,200 ac)	Forest / range mosaic	All PVGs on S-CNF(see Table 3-13)	347,249
American marten	148 (74,000 ac)	444 (142,100 ac)	Broad elevation old forest	Dry forest – Douglas fir and ponderosa pine, cold forest – Douglas fir, lodgepole, spruce and subalpine fir	330,934
Pileated woodpecker	34 (27,400 ac)	127 (103,600 ac)	Broad elevation old forest	Dry forest – Douglas fir and ponderosa pine	241,306
Vesper sparrow	1,184 (29,600 ac)	2,812 (140,600 ac)	Range, early and late forest	Dry forest – Douglas fir and ponderosa pine, cool shrub, dry shrub	327,487
Yellow warbler	1,480 (6500 ac)	7,400 (31,800 ac)	Forest, woodland sagebrush	Dry forest – Douglas fir and ponderosa pine, woodland, dry shrub	74,115
Ruby-crowned kinglet	19,000 (27,400 ac)	111,000 (159,100 ac)	Broad elevation old forest	Dry forest – Douglas fir and ponderosa pine	370,577
Northern goshawk	37 (102,100 ac)	53 (140,600 ac)	Broad elevation old forest	Dry forest – Douglas fir and ponderosa pine	327,487
Great gray owl	22 (37,000 ac)	44 (74,000 ac)	Broad elevation old forest	Dry forest – Douglas fir and ponderosa pine	172,362

TABLE 3-10
Management Indicator Species Estimated Minimum Viable Populations (MVP) and 1988 Population Levels on the Former Salmon National Forest and Anticipated Acres of Suitable Habitat on the S-CNF, excluding the FCRONRW.

Management Indicator Species	Estimated MVP on SNF and Required Habitat Acres (nearest 100 ac)[1]	Estimated Population and Acres of Suitable Habitat on SNF in 1988 (nearest 100 ac)[1]	Source Habitat Type	Potential Vegetation Groups	Anticipated Acres of Suitable Habitat on the S-CNF
Yellow-bellied sapsucker	355 (1800 ac)	355 (1,800 ac)	Broad elevation old forest	Dry forest – Douglas fir and ponderosa pine	4,137
Pygmy nuthatch	2,812 (2800 ac)	6,600 (6,700 ac)	Low elevation old forest	Dry forest – Douglas fir and ponderosa pine	15,513
Brown creeper	1,332 (13,300ac)	6,600 (66,600 ac)	Broad elevation old forest	Dry forest – Douglas fir and ponderosa pine	155,125
Red squirrel[2]	Unknown	Unknown	Broad elevation old forest	Dry forest – Douglas fir and ponderosa pine	370,577[a]
Mountain bluebird	1,480 (29,600 ac)	7,4000 (148,000 ac)	Range, early and late forest	Dry forest – Douglas fir and ponderosa pine, cool shrub, dry shrub	344,723
Bald eagle	3 (11,800 ac)	## (11,800 ac)	Forest, woodland sagebrush	Dry forest – Douglas fir and ponderosa pine, woodland, dry shrub	27,578
Peregrine falcon	4 (111,000 ac)	0 (111,000 ac)	Forest, woodland sagebrush	Dry forest – Douglas fir and ponderosa pine, woodland, dry shrub	258,542
Gray wolf	7 (74,000 ac)	4 (74,000 ac)	Forest / range mosaic	All PVGs on S-CNF(see Table 3-13)	172,362
Grizzly bear[3]	(29,600 ac)	(29,600 ac)	Forest / range mosaic	All PVGs on S-CNF(see Table 3-13)	68,945

[1]Existing = 1988, the date of Salmon National Forest Land and Resource Management Plan publication
[2]The red squirrel was designated as an MIS on the former Challis NF. No estimates of MVP or suitable habitat were provided. Estimated suitable habitat on the S-CNF is based on estimated area of suitable habitat for the ruby-crowned kinglet, which occupies similar habitat.
[3]Grizzly Bear Recovery Plan does not involve recovery efforts on the Salmon NF, therefore MVP numbers are not included
##Bald eagle population trends are increasing on the Salmon NF from the 1988 levels. Bald eagles are known to nest and are frequently observed on the Salmon River.

e. Source Habitats–Families and Groups

This text describing source habitats, families, and groups is adapted from specialist's reports developed for the Gibbonsville Environmental Assessment (U.S. Forest Service 2002a).

Source habitats describe primary plant components and vegetation structural characteristics, which are a part of a species' overall set of environmental conditions that contribute to a stationary or positive population growth (Wisdom et al. 2000). Habitat characteristics include structural stage, vegetation cover type, and special habitat features such as snags, downed logs, or caves. Source groups are a collection of species that have similarities in source habitats; source families are a collection of groups of species that are used to describe project level habitat characteristics and evaluate management actions. There are 7 source habitat families evaluated for the S-CNF that represent "species of focus," those species for which there is ongoing concern about population or habitat status. In addition to source habitats, species of focus often have one or more legal or special management designations. There are four designations that apply to species in this document: federally listed threatened or endangered species, Regional Forester sensitive species, Forest Plan management indicator species, and Idaho high priority birds. Threatened or endangered species are officially designated by the USFWS as having their existence threatened over their entire range or localized area because of habitat loss or population declines. Experimental non-essential populations are officially designated by the USFWS as either threatened or endangered that are released as experimental populations outside their currently occupied range, but within probable historic habitat, to further species conservation. R4 sensitive species are selected because there is a concern for population numbers or habitat. MIS species are selected to evaluate the effects of the proposed management activities and are considered to be key species that represent a broad range of wildlife species and have habitat requirements similar to other groups of animals. Idaho high priority birds are birds that have been recognized by Idaho Partners in Flight as a concern due to declining trends in either habitat or populations.

1) Population Status and Trends. Population status and trends for birds data were obtained from the Partners in Flight Species Assessment Database (Partners in Flight 2002a). Much of this information was reported in the Gibbonsville Environmental Assessment (U.S. Forest Service 2002b) and includes relative abundance and interpretation of population trends. Mammal and amphibian population status and trends are available through the Natural Heritage Program and Conservation Data Centers data provided in *Atlas of Idaho's Wildlife* (Groves et al. 1997) and where available, individual species conservation plans. Local survey data were used where available for some bird species such as the northern goshawk and flammulated owls. Idaho Department of Fish and Game population data were used for elk and mule deer; and trapping records were used for furbearers where available. Population data are not available for some species.

Species accounts are found in several support documents, including the *Atlas of Idaho's Wildlife* (Groves et al. 1997) that provides species accounts and primary State references for all terrestrial species analyzed in this document. Most threatened, endangered, and sensitive species accounts are found in threatened, endangered, sensitive species of the Intermountain Region (U.S. Forest Service 1991b); and many of the bird species accounts are found in the Idaho Bird Conservation Plan (Partners in Flight 2000). Species with management or conservation plans include the bald eagle, northern goshawk, gray wolf, grizzly bear, and lynx. Species account references, if different than Groves (1997), are listed at the end of each family discussion. Tables 3-11 and 3-12- show the relative abundance and population trends for mammal and bird species, respectively, in the groups selected for

analysis in this Final EIS. Table 3-11 reflects trend data from the Idaho Department of Fish and Game's (IDFG) annual big game counts along with interpretations and conclusions from IDFG and S-CNF wildlife biologists (personal communication Dr. Tom Keegan IDFG, Salmon Region IDFG Wildlife Manager and Dick Wenger, Wildlife Biologist, S-CNF). Big game populations are managed by the IDFG. Habitat availability and condition are only two of several factors considered by IDFG in determining harvest levels and population goals. Big game population trends therefore may not directly reflect habitat conditions on the S-CNF. Populations are managed by IDFG to meet the goals established for specific Game Management Units. Therefore, some units may be increasing while others may be decreasing in population.

TABLE 3-11
Population status and trends for MIS Mammals on the S-CNF

MIS	Population Status	Population Trend
Gray wolf	Introduced experimental, non-essential population,	Stable to increasing
Grizzly bear[1]	Does not occur on the S-CNF	
Elk	Common	Stable to slight decrease
Mule deer	Relatively common	Stable to increasing
Bighorn sheep	Uncommon in suitable habitat	Stable but currently low (subject to disease from domestic sheep)
Pronghorn antelope	Relatively uncommon	Increasing
Mountain goat	Uncommon in suitable habitat	Decreasing
American marten	Common	Stable
Red sqiurrel	Common	Stable

[1]The grizzly bear recovery plan does not include recovery efforts on the S-CNF, and none are present.

TABLE 3-12
Bird Population Relative Abundance and Trends from Partners in Flight Database for Bird Conservation Region 10 (Rocky Mountains) and Physiographic Area 68 (Northern Rockies) for S-CNF Species of Focus

Species	Relative Abundance	Trend Interpretations Region 10 (Physiographic Area 68)
Pygmy Nuthatch	3	Stable
Northern Goshawk (summer)	5	Possible Decline
Northern Goshawk (winter)	5	Possible Decline
Flammulated Owl	5	No data
Pileated Woodpecker	4	Significant Increase
Brown Creeper	4	Significant Increase (Uncertain)
Ruby Crowned Kinglet	3	Stable (Moderate Decline)
Yellow-bellied Sapsucker	4	No data
Boreal Owl	5	No data
Great Gray Owl	5	No data
Three-toed Woodpecker	4	Uncertain
Bald Eagle	4	Significant Increase
Harlequin Duck	3	No Data
Yellow Warbler	3	Moderate Decline (Stable)
Peregrine Falcon	5	Uncertain
Mountain Bluebird	3	Possible Increase (Significant Increase)
Vesper Sparrow	2	Stable
Greater Sage Grouse	3	Declining

Relative abundance is a measure of the component of vulnerability that reflects the abundance of breeding individuals of a species, within its range, relative to other species (premise that rare or uncommon are more vulnerable to decline or extinction than species that are more common)[avg # birds/BBS route].
[1] Highest relative abundance
[2] High
[3] Moderate
[4] Low
[5] Lowest

2) Source Habitat Families. The strategy of grouping species relative to their source habitats as presented by Wisdom et al. (2000) in their analysis of terrestrial vertebrates for the Interior Columbia Basin was used for this assessment. The 31 species in this analysis are organized into 9 families and 18 groups (Table 3-13).

Source habitat groups are composed of one or more species that share common source habitats as defined by vegetation cover types and structural stages (Table 3-14). Similar groups also are clustered into families whose source habitats generally fall into similar terrestrial community groups, a broader classification that includes several cover types.

Source habitat trends for the Central Idaho ERU (Table 3-15) are generally neutral for 7 of the 9 families described in this document (Wisdom et al. 2000). Declining trends in source habitat are reported for family 1 (low elevation, old forest family) and family 8 (rangeland and early- and late-seral forest family). Habitat decline is associated with changes from historic to current periods. The use of family level habitat trends is a coarse-filter approach and provides an understanding of changes at the broad-scale of the S-CNF. The approach used in this document, to group focal species by source habitats, is similar to the approach taken by Noss et al. 2001.

a) Family 1: Low Elevation, Old Forest Family—Group 1 – Pygmy nuthatch

Source Habitat and Special Habitat Features

The species in this family are associated with late seral single-layer ponderosa pine, and multi-layer Douglas-fir. Special features include large-diameter snags for foraging and nesting (Wisdom et al. 2000).

Broadscale-Columbia River Basin and the Central Idaho ERU

Basin-wide, 70 percent of the watersheds are reported as having a declining trend in source habitat for family 1 (Wisdom et al. 2000). The Central Idaho ERU is among the majority (11 of 13) of sub-basins with a declining trend in more than 50 percent of the watersheds within the sub-basin. Basin-wide decreases in source habitats are related to declines in old forest lower montane. Declines occurred in both late-seral single and late-seral multi-layer and were considered ecologically significant except for the old-forest multi-layered in the Central Idaho sub-basin (Hann et al. 1997). The decline in late-seral single-layered lower montane represents the strongest decline in source habitats for the basin noted by Wisdom et al. (2000).

S-CNF

Declines in late-seral single-layer lower montane for the S-CNF are similar to declines reported for the basin and Central Idaho ERU (Wisdom et al. 2000 and U.S. Forest Service 2002a). However, late-seral multi-layer trends for the S-CNF are of a greater magnitude than the ERU trend (U.S. Forest Service 2002a).

Pygmy nuthatch. The pygmy nuthatch is almost exclusively associated with lower montane ponderosa pine late-seral single- and multi-storied forests with fairly open canopies (Wisdom et al. 2000). Pygmy nuthatches require large-diameter (greater than 21 inches) snags or trees with cavities for nesting and foraging; since this species is a secondary cavity nester it can utilize a variety of nesting structures (McEllin 1979). This species has one of the most limited ranges of any species inhabiting the Salmon River drainages (Roberts 1992).

b) Family 2: Broad Elevation, Old Forest Family—Group 5 – Northern goshawk (summer habitat), flammulated owl, American marten, fisher; Group 6 –Pileated woodpecker, brown creeper, ruby crowned kinglet, yellow-bellied sapsucker (formerly grouped with the red-naped sapsucker), red squirrel; Group 7 – Boreal owl; Group 8 – Great gray owl; Group 11 – Three-toed woodpecker.

Source Habitat and Special Habitat Features

Species in family 2 use late-seral multi- and single-layered stages of the montane community (Wisdom et al. 2000). Similarities exist with family 1, but this family uses a mix

of cover types including lower elevation ponderosa pine and interior Douglas-fir. All of the species in this family except the ruby crowned kinglet depend on snags; several including the fisher, American marten, and pileated woodpecker, also depend on downed logs for foraging or nesting. Large hollow trees are also important to the pileated woodpecker and the boreal owl. Prey species for many species in this group depend on special features common in the late seral stages such as lichens and fungi.

Source habitats common to the Group 5 species include late seral stages of the montane community group and unmanaged young forests because these contain sufficient large-diameter snags and logs needed for various life functions of the species in this group. Source habitats for martens extend up into these same stages of subalpine forests. Martens are apparently more sensitive to vegetation patch size than other members of Group 5 and usually avoid clearcuts dominated by grasses, forbs, and saplings, especially in winter (Wisdom et al. 2000). Downed woody material is likely the key component of marten foraging areas (Coffin et al. 1997), providing habitat for many of their prey and subnivian (under the snow) access to prey during the winter. Fishers and martens also depend on down logs for resting and denning (Buskirk and Powell 1994; Raphael and Jones 1997).

Old forests consisting of ponderosa pine and Douglas-fir seem to be a key component of flammulated owl home ranges (Reynolds and Linkhart 1992). Variability in the structure of these old forest stands seems important to support life functions of flammulated owls with roosting occurring in fairly dense stands and foraging occurring in more open stands (Wisdom et al. 2000).

Source habitats for the species in Group 6 are generally late-seral stages of subalpine, montane, lower montane, and riparian woodland plant community groups (Wisdom et al. 2000). Large and smaller snags are important for nesting, roosting, and/or foraging.

Red squirrels require mature coniferous trees as a source of cones and seed (DeGraaf and Rudis 1986). The best cone production occurs in 200- to 300-year old Douglas-fir and 150- to 200-year-old Engelmann spruce. Large trees in a group closely spaced in 0.1 acre (0.04 ha) or less are favored. Females prefer to nest in natural tree cavities or abandoned woodpecker (Picidae) holes, tree hollows, or any other small crevice (DeGraaf and Rudis 1986).

Broadscale-Columbia River Basin and the Central Idaho ERU

Most watersheds (59 percent) showed a declining trend in source habitat for family 2 (Wisdom et al. 2000). The Central Idaho ERU was reported as having a neutral trend but among the group of sub-basins that had 43 percent or more of the watersheds in a declining trend. Basin-wide source habitat for most species in family 2 declined due to the decrease in ponderosa pine habitats. Exceptions were three-toed woodpecker source habitat, which increased, and great gray owl source habitat, which remained neutral because their source habitats are not ponderosa pine. Basin-wide declines in source habitat for family 2 are associated with timber harvest, fire exclusion and changes in insect and disease infestation cycles.

Declines in source habitats primarily occurred in late-seral lower montane single-layer forest, which was projected to have more than an 80 percent decline in spatial extent since historic period (Hann et al. 1997).

TABLE 3-13
Special Habitat Features and Source Habitats for S-CNF Weed EIS Species of Focus[a]; adapted from U.S. Forest Service 2002a and Wisdom et al. (2000)

			Cold Forest							Dry Forest											
			Spruce/Fir/Lodgepole			Ponderosa Pine				Douglas-Fir with Ponderosa Pine				Douglas-Fir without Ponderosa Pine				Douglas-Fir/Lodgepole Pine			
Fmly	Grp	Common Name	ES	MS	LSM	ES	MS	LSM	LSS	ES	MS	LSM	LSS	ES	MS	LSM	LSS	ES	MS	LSM	LSS
1	1	Pygmy Nuthatch							X			X	X								
1									X							X					
2	5	Northern Goshawk (summer)					X	X	X		X	X	X		X	X	X		X	X	X
2	5	Flammulated Owl					X	X	X		X	X	X		X	X	X				
2	5	American Marten		X	X						X	X	X		X	X	X		X	X	X
2	5	Fisher													X	X	X		X	X	X
								X	X			X	X			X	X				
2	6	Pileated Woodpecker						X	X			X	X			X	X				
2	6	Brown Creeper			X			X	X			X	X			X	X				
2	6	Ruby Crowned Kinglet			X											X	X			X	X
2	6	Yellow-bellied Sapsucker						X	X			X	X			X	X				
2	6	Red squirrel			X			X	X			X	X			X	X			X	X
2	7	Boreal Owl		X	X										X	X	X		X	X	X
2	8	Great Gray Owl	X	X	X									X	X	X	X	X	X	X	X
2	11	Three-toed Woodpecker			X															X	X
3	15	Wolverine	X	X[1]	X									X	X[1]	X	X	X	X[1]	X	X
3	16	Canada Lynx	X	X	X									X	X	X		X	X[1]	X	
5	19	Gray Wolf	X	X	X	X	X[2]	X	X	X	X[2]	X	X	X	X	X	X	X	X[1]	X	X
5	19	Grizzly Bear	X	X[1]	X	X	X[2]	X	X	X	X[1]	X	X		X[1]	X	X	X	X[1]	X	X
5	20	Mountain Goat					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	22	Bighorn Sheep				X				X				X				X			
5	22	Elk		X	X		X	X	X		X	X	X		X	X	X		X	X	X
5	22	Mule Deer	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				

TABLE 3-13
Special Habitat Features and Source Habitats for S-CNF Weed EIS Species of Focus[a]; adapted from U.S. Forest Service 2002a and Wisdom et al. (2000)

			Cold Forest							Dry Forest										
			Spruce/Fir/Lodgepole			Ponderosa Pine				Douglas-Fir with Ponderosa Pine				Douglas-Fir without Ponderosa Pine				Douglas-Fir/Lodgepole Pine			
Fmly	**Grp**	**Common Name**	**ES**	**MS**	**LSM**	**ES**	**MS**	**LSM**	**LSS**	**ES**	**MS**	**LSM**	**LSS**	**ES**	**MS**	**LSM**	**LSS**	**ES**	**MS**	**LSM**	**LSS**
6	25	Northern Goshawk (winter)					X	X	X												
7	26	Bald Eagle						X				X[3]									
7	26	Harlequin Duck						X[3]				X[3]									
7	26	Yellow Warbler																			
7	26	Spotted Frog																			
7	27	Townsend's Big-Eared Bat					X[1]	X	X		X[2]	X	X	X	X	X	X		X[1]	X	X
7	28	Spotted Bat					X[2]	X	X		X[2]	X	X	X	X	X	X				
7	28	Peregrine Falcon																			
8	29	Mountain Bluebird				X			X	X				X							
10	31	Vesper Sparrow																			
10	31	Pronghorn																			
11	33	Pygmy rabbit																			
11	33	Sage Grouse																			

TABLE 3-13
Special Habitat Features and Source Habitats for S-CNF Weed EIS Species of Focus[a]; adapted from U.S. Forest Service 2002a and Wisdom et al. 2000

			Riparian Woodlands						Upland Shrubland										Herb	
			Aspen			Cottonwood Willow			Chokecherry Serviceberry Rose			Mountain Mahogany		Big Sagebrush			Mtn big sagebrush		Grass	
Fm	Grp	Common Name	ES	MS	LSM	ES	MS	LSM	Ts	Cms	Ch	Os	Cs	Os	Cs	Ch	Os	Cs	Ch	Oh
1	1	Pygmy Nuthatch																		
2	5	Northern Goshawk (summer)							X	X	X									
2	5	Flammulated Owl		X	X		X													
2	5	American Marten		X	X															
2	5	Fisher					X	X												
2	6	Pileated Woodpecker																		
2	6	Brown Creeper																		
2	6	Ruby Crowned Kinglet																		
2	6	Yellow–bellied Sapsucker		X	X		X	X	X	X	X									
2	6	Red squirrel																		
2	7	Boreal Owl		X	X															
2	8	Great Gray Owl	X	X	X															
2	11	Three-toed Woodpecker																		
3	15	Wolverine																		
3	16	Canada Lynx	X	X	X	X	X	X												
5	19	Gray Wolf	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	
5	19	Grizzly Bear	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	
5	20	Mountain Goat																		
5	22	Bighorn Sheep			X															
5	22	Elk	X	X	X				X	X	X	X	X	X	X				X	
5	22	Mule Deer																		

TABLE 3-13
Special Habitat Features and Source Habitats for S-CNF Weed EIS Species of Focus[a]; adapted from U.S. Forest Service 2002a and Wisdom et al. 2000

			Riparian Woodlands									Upland Shrubland								Herb	
			Aspen			Cottonwood Willow			Chokecherry Serviceberry Rose			Mountain Mahogany		Big Sagebrush			Mtn big sagebrush		Grass	
Fm	Grp	Common Name	ES	MS	LSM	ES	MS	LSM	Ts	Cms	Ch	Os	Cs	Os	Cs	Ch	Os	Cs	Ch	Oh
6	25	Northern Goshawk (winter)							X	X	X									
7	26	Bald Eagle			X			X												
7	26	Harlequin Duck			X			X												
7	26	Yellow Warbler	X	X	X	X	X	X												
7	26	Spotted Frog	X	X	X	X	X	X												
7	27	Townsend's Big-eared Bat		X	X		X	X				X	X	X	X		X	X		
7	28	Spotted Bat												X	X		X	X		
7	28	Peregrine Falcon	X	X		X	X													
8	29	Mountain Bluebird	X		X				X			X		X		X	X		X	
10	31	Vesper Sparrow												X	X	X	X	X		
10	31	Pronghorn												X	X	X	X	X		
11	33	Pygmy rabbit												X	X	X	X	X		
11	33	Sage Grouse												X	X	X	X	X	X	

TABLE 3-13
Special Habitat Features and Source Habitats for S-CNF Weed EIS Species of Focus[a]; adapted from U.S. Forest Service 2002a and Wisdom et al. 2000

			Riparian Woodlands						Upland Shrubland										Herb	
			Aspen			Cottonwood Willow			Chokecherry Serviceberry Rose			Mountain Mahogany		Big Sagebrush			Mtn big sagebrush		Grass	
Fm	Grp	Common Name	ES	MS	LSM	ES	MS	LSM	Ts	Cms	Ch	Os	Cs	Os	Cs	Ch	Os	Cs	Ch	Oh

[1] – not stem exclusion closed
[2] – not stem exclusion open or closed
[3] – needs to be near water
ES – early-seral
MS – mid-seral
LSM – late-seral-multi-layer
LSS – late-seral single-layer
Ts – tall shrub
Cms – closed medium shrub
Ch – closed herbland
Os – open shrub
Cs – closed shrub
Oh – open herbland

TABLE 3-14
Source Habitat Groups and Families Assigned to the 31 Terrestrial Vertebrate Species Analyzed in this Document based on Wisdom et al. (2000)

Family	Type
Family 1	**Low Elevation, Old Forest Family**
Group 1	Pygmy nuthatch
Family 2	**Broad Elevation, Old Forest Family**
Group 5	Northern goshawk (summer habitat), flammulated owl, American marten, fisher
Group 6	Pileated woodpecker, brown creeper, ruby crowned kinglet, yellow-bellied sapsucker (formerly grouped with the red-naped sapsucker), red squirrel
Group 7	Boreal owl
Group 8	Great gray owl
Group 11	Three-toed woodpecker
Family 3	**Forest Mosaic Family**
Group 15	Wolverine
Group 16	Canada lynx
Family 5	**Forest and Range Mosaic Family**
Group 19	Gray wolf and grizzly bear
Group 20	Mountain goat
Group 22	Elk and mule deer (migration routes and winter range) and bighorn sheep
Family 6	**Forest, Woodland, Montane Shrub Family**
Group 25	Northern goshawk (winter)
Family 7	**Forest, Woodland, and Sagebrush Family**
Group 26	Bald eagle, harlequin duck, yellow warbler, spotted frog
Group 27	Townsend's big-eared bat
Group 28	Spotted bat, peregrine falcon
Family 8	**Rangeland and Early- and Late-Seral Forest Family**
Group 29	Mountain bluebird
Family 10	**Range Mosaic**
Group 31	**Vesper sparrow and pronghorn**
Family 11	**Sagebrush**
Group 33	Sage grouse (summer and winter) **and pygmy rabbit**

TABLE 3-15
Source Habitat Trends for the Nine Families in the Central Idaho Basin ERU (Wisdom et al. 2000) used for Analysis in this Document

Family	Percentage of Watersheds Decreasing	Percentage of Watersheds Neutral	Percentage of Watersheds Increasing	Dominant Trend
1	57	33	9	Decreasing
2	43	22	35	Neutral
3	21	48	31	Neutral
5	18	52	30	Neutral
6	48	22	30	Neutral
7	34	36	30	Neutral
8	79	15	6	Decreasing
10	35	37	28	Neutral
11	42	30	27	Neutral

S-CNF

Declines in ponderosa pine and dry Douglas-fir old-forest single-story have occurred Forest-wide (U.S. Forest Service 1995b; U.S. Forest Service 2002a). The primary reasons for decline are similar to family 1. Timber harvest and fire exclusion are the two primary reasons for the decline in old-forest single-story, and the resulting increase in multi-storied stands. The decline in ponderosa pine within the dry Douglas-fir PVTs is directly related to fire suppression. Dry Douglas-fir PVTs have gradually shifted from ponderosa pine-dominated communities to more shade-tolerant Douglas-fir, which is represented by an increase in late-seral multi-layer forests.

c) Family 3: Forest Mosaic Family—Group 15 – Wolverine; Group 16 – Lynx

Source Habitat and Special Habitat Features

Species in this family are habitat generalists and use a variety of different habitats in the lower-montane, montane, subalpine, and riparian woodlands. Special habitat features include downed logs that are used for nesting and denning sites and talus slopes as potential denning sites for the wolverine (Wisdom et al. 2000). Additionally, large remote tracts of land with limited human disturbance are important, especially for the wolverine (Ruggiero et al. 1999).

Broadscale-Columbia River Basin and the Central Idaho ERU

Trends in source habitat for family 3 were predominately neutral for watersheds within the basin including the Central Idaho ERU (Wisdom et al. 2000). Overall changes in the extent of source habitats since historic period were not substantial, however Hann et al. (1997) detected notable changes in the extent of terrestrial community types that compose source habitat. In particular, the lower montane, montane, and subalpine communities showed contrasting changes in structural stages. The lower montane and montane communities were projected as having a decline in early- and late-seral stages and an ecologically significant increase in mid-seral stages. The subalpine community showed a decline in late-seral multi-layer and ecologically significant increases in early- and late-seral single layer.

S-CNF

Trends vary for the lower montane and montane habitats for the S-CNF compared to trends reported by Hann et al. (1997) for the Central Idaho ERU. Similarities include a decline in early- and late-seral. Specific to the S-CNF is a substantial decline in late-seral single and increases in mid-seral. Notable differences between the S-CNF in comparison to the ERU include a greater departure in late-seral multi-layer, which is nearly double the amount of the current ERU and early seral, which is less than half of the current ERU. This suggests the S-CNF is in much greater departure from historic conditions than the overall values assigned to the ERU for early-seral and late-seral multi-layer for the dry forest PVGs.

Wolverine. Wolverines are considered rare mammals and little is known about this carnivore. Historical accounts are few, but a biological reconnaissance of south-central Idaho (Merriam 1891) describes wolverines, along with martens and fishers, as "common" to the spruce and Douglas-fir zones of the Salmon River Mountains. Wolverines are considered secretive and solitary, and they are notorious for occupying inaccessible high elevation mountainous habitat (Banci 1994). Wolverines also use boreal and mountain forests (Groves et al. 1997) in all structural stages except closed canopy stem exclusion (Wisdom et al. 2000). High elevation basins that function as natal den sites are found in the upper reaches of watersheds on the S-CNF.

Canada Lynx. Habitat for the Canada lynx exists within the S-CNF and lynx occurrences are documented for the Salmon River watershed (Lewis and Wenger 1998). The S-CNF identified and mapped (U.S. Forest Service 2000a) LAUs (lynx analysis units) based on general guidance provided in the Lynx Conservation Assessment and Strategy (Ruediger et al. 2000). LAU boundaries for the S-CNF are based on 6th code hydrologic units and are generally larger than 10,000 acres.

Suitable lynx habitat is defined as having the capability to provide necessary habitat components for denning and foraging. Existing condition of suitable habitat may or may not meet the needs of a lynx. Changes in condition of suitable habitat can occur from natural disturbances such as fire, wind events, and erosion; timber harvesting; or the lack of disturbances. Aspen, snowberry, serviceberry, and chokecherry, and dense stands of young conifer provide important habitat for snowshoe hare, the primary prey species for lynx. Mature closed canopy forests provide habitat for the red squirrel, an important alternate prey species for lynx. Riparian habitats, willow, cottonwood, and other streamside vegetation provide important travel corridors for lynx.

Non-lynx habitat includes ponderosa pine and dry Douglas-fir with a ponderosa pine component. Lynx may use the dry forest type incidentally but it is not considered a major component of lynx habitat.

Denning habitat is limited to the mature structural stages in the moist Douglas-fir, subalpine fir, and lodgepole pine habitats that have sufficient amounts of large woody debris on the ground.

Foraging habitat is variable and dependent on available prey species such as snowshoe hare and red squirrels. Denning and foraging habitat are not mutually exclusive and commonly occur on the same areas of suitable habitat. Large patches of densely spaced seedling and sapling-sized conifer trees with low branches characterize snowshoe hare habitat.

Linkage corridors are defined as landscape areas that "connect forested habitats that allow lynx and other wide ranging carnivores to easily move long distances in search of food, cover and mates" (Ruediger et al. 2000). Landscape corridors characterized by extensive, continuous habitat connectivity go beyond the function of allowing daily and seasonal movements between home range segments. Such corridors in a fragmented habitat matrix may provide key connectivity between subpopulations in large habitat patches, functioning as landscape linkages and dispersal corridors (Harris 1984).

The S-CNF is situated along the west side of the northern continental divide, a widely recognized landscape linkage corridor connecting the Northern and Southern Rockies (Montgomery 2001; Noss et al. 2001). This landscape linkage corridor extends south of the S-CNF boundary to the Greater Yellowstone Ecosystem and north into Canada. The Forest Service lynx map has designated that portion of the Rocky Mountains on the S-CNF as the Northern Continental Divide Corridor. This corridor provides north-south connectivity for dispersing lynx and other wide-ranging carnivores.

d) Family 5: Forest and Range Mosaic Family—Group 19 – Gray wolf and grizzly bear; Group 20 – Mountain goat; Group 22 – Elk and mule deer–big game winter range and migration routes and bighorn sheep

Source Habitat and Special Habitat Features

Species in this family use all of the structural stages in the montane, lower montane, and subalpine community types; the grizzly bear also uses alpine and rocky areas (Wisdom et al. 2000). Riparian, woodlands, shrublands, herblands, and single- and multi-layer mid- and late-seral forests are considered important winter habitats for elk and mule deer.

Broadscale-Columbia River Basin and the Central Idaho ERU

More than 50 percent of the watersheds showed a stable trend in source habitat for family 5 (Wisdom et al. 2000). The Central Idaho ERU was reported as having a neutral trend but there were also a number of watersheds within the ERU that had an increasing trend. Basin-wide increases in source habitat are related to declines in old forest and subsequent increase of mid-seral structural stages that also serve as source habitat for members of this family.

S-CNF

S-CNF trends follow that of the basin and sub-basin in declines of late-seral single-layer but not in late-seral multi-layer. Fire exclusion has resulted in a continuing decline of the remaining old forest single layer and a subsequent increase of old forest multi-layer in the montane and lower montane types. Areas that were harvested in recent times have caused an overall decline of late-seral stages and an increase in mid-seral stages.

Gray wolf. Gray wolves were discussed at length earlier in this section.

Grizzly bear. This species (*Ursus arctos horribilis)* was federally listed as threatened on March 11, 1967. On November 11, 2000, the USFWS listed some populations in Montana and Idaho as experimental in order to facilitate restoration to designated recovery areas. These recovery areas are based on three remaining large 'islands' of bear habitat in the U.S. and adjacent Canada. These have been designated as the Northern Continental Divide Ecosystem, Bitterroot (or Salmon-Selway) Ecosystem, and Yellowstone Grizzly Bear Ecosystem (or Greater Yellowstone Ecosystem) Recovery Zones by the USFWS

(58 FR 68543). The Bitterroot (Salmon-Selway) Ecosystem has historically supported grizzly bear populations, but these bears were removed by direct killing and loss of habitat and prey (particularly salmon). A reintroduction effort is currently being considered in this Recovery Zone. The species' status for this area is experimental. Grizzly bears in the Yellowstone and Northern Continental Divide grizzly bear recovery zones remain listed as threatened under the ESA.

The grizzly (or brown) bear was once found in a wide variety of habitats, including open prairie, brushlands, riparian woodlands, and semidesert scrub. Grizzly bears have one of the largest home range areas of all land animals, between 300 and 1,000 square miles. This immense range encompasses a series of habitats, most of which are in upper elevation forested wild lands such as portions of the S-CNF. This species is common only in habitats where food is abundant and concentrated, including white-bark pine, berries, salmon or cutthroat trout runs, and caribou calving grounds. As the end of summer approaches, bears enter a biological phase called hyperphagia, the period of time when they eat tremendous amounts of food to store extra pounds of fat before entering the den. Huckleberries are one of their favorite foods at this time of year.

Mountain goat. Mountain goats are found in alpine and subalpine habitat (from sea level to about 2,440 m) 8,000 feet), but usually at timberline or above) on steep grassy talus slopes, grassy ledges of cliffs, or alpine meadows (Groves et al. 1997). They may seek shelter and food in stands of spruce or hemlock in winter. They graze on grasses and forbs in summer and browse shrubs and conifers. The winter diet is often variable when they may feed on mosses and lichens, as well as grasses, shrubs, and conifers.

Elk and mule deer. Several primary elk migration corridors exist within the S-CNF. The migration corridors support movement of large numbers of elk between Montana summer range and Idaho winter range along the Salmon River. The herds that repeat this movement each year are locally known as the interstate elk herd. Several thousand animals migrate from Montana into the North Fork Ranger District to winter ranges near Wagonhammer, south of Gibbonsville. Migration routes occur from Montana's Big Hole Valley (May Creek), Lost Trail Pass, and West Fork and pass through Idaho's Hughes Creek, Lick Creek, Sheep Creek, Dahlonega Creek, Anderson Creek, and the Granite Mountain area. The elk migration routes provide winter access into key winter range in Crone Gulch, Anderson Mountain, Threemile, Lick, Sheep, and Silverlead Creeks in the S-CNF and the Wagonhammer-Burns Basin adjacent to the southern portion of the S-CNF.

Key big game winter range is that portion of the winter range used by elk during severe winter conditions and is considered essential for the species survival (Elk Habitat Relationships for Central Idaho, U.S. Forest Service 1981).

The majority of elk winter range occurs at elevations generally below 5,500 feet, and is characterized by the ponderosa pine series. This vegetation type provides forage and thermal cover during the winter, and early spring forage. Large ponderosa pine trees provide important bedding sites. Shrub species present in the pine communities provide important forage and include sagebrush, bitterbrush, and mountain mahogany. Douglas-fir communities are more prevalent within the S-CNF and are found in the mid-elevations in a wide band. Elk and mule deer use the lower elevation Douglas-fir communities extensively for winter thermal cover. Perennial grasses and forbs in the Douglas-fir communities

provide important winter forage and, where present, sagebrush, bitterbrush, or mountain mahogany are used by mule deer. Douglas-fir communities occur in many of the drainages throughout the S-CNF (U.S. Forest Service 1998a). Vegetation types that do not provide winter range habitat occur at higher elevation where snow depth limits movement.

Security habitats are contiguous areas of vegetation that provide a combination of hiding cover and space that protect elk during periods of stress. Size of the area varies based on remoteness, topography, and vegetation that will provide a sense of security to the elk. High-quality security blocks are present in the unroaded portions along the northern, eastern, and northwestern S-CNF boundaries (Lost Trail-Gibbonsville Integrated Resource Analysis U.S. Forest Service 1995b).

Bighorn sheep. Bighorns are found in alpine-desert grasslands associated with mountains, cliffs, foothills, or river canyons (Groves et al. 1997). They often eat grasses, but the diet also includes significant amounts of shrubs and forbs. Shrubs may dominate summer diet in some areas.

e) Family 6: Forest, Woodland, Montane Shrub Family—Group 25 –Northern goshawk (winter)

Source Habitat and Special Habitat Features

Source habitats that occur in the S-CNF for this family include old and unmanaged young forests in lower montane (ponderosa pine, dry Douglas-fir PVTs), montane forests (interior Douglas-fir PVT), mature riparian and upland woodlands, chokecherry-serviceberry-rose, mountain mahogany, and riparian shrublands. Special winter habitat features for the goshawk include prey components including snags, downed logs, woody debris, large trees, openings, herbaceous and shrubby understories, and an intermixture of various forest structural stages (Reynolds et al. 1992; Wisdom et al. 2000).

Broadscale-Columbia River Basin and the Central Idaho ERU

The majority of watersheds (45 percent) in the basin had decreasing trends, while 37 percent had increasing trends; the Central Idaho ERU is reported as having an overall neutral trend. Declines were associated with a reduction in late-seral and early-seral lower montane and montane forests, riparian woodlands, and riparian shrublands (Hann et al. 1997). Increases were associated with transitions to mid-seral forests, primarily managed young forests, and to increases in upland woodland community group.

S-CNF

The S-CNF follows the same trends described for the broadscale basin and Central Idaho ERU. Declines in the early-seral and late-seral single-layer lower montane and montane have resulted in an increase in mid-seral and late-seral multi-layer structures in the ponderosa pine and dry Douglas-fir PVTs.

Trends for riparian and upland woodland are not known for the fine-scale S-CNF, however, it is likely that these communities have declined due to the increase in mid-seral conditions.

Northern goshawk. The northern goshawk is considered a rare resident (Roberts 1992) and a Region 4 Forest Service sensitive species. Source habitats that occur in the S-CNF for this species include old and unmanaged young forests in lower montane (ponderosa pine, dry Douglas-fir PVTs), montane forests (interior Douglas-fir PVT), mature riparian and upland

woodlands, chokecherry-serviceberry-rose, mountain mahogany, and riparian shrublands. Summer habitat for the northern goshawk is described in Family 2, Group 5. Northern goshawk populations are known as partial migrants; some portion of the northern goshawk populations winter outside the breeding area, while others do not (Squires and Reynolds 1997).

f) Family 7: Forest, Woodland, and Sagebrush Family—Group 26 – Bald eagle, harlequin duck, yellow warbler, and spotted frog; Group 27 – Townsend's big-eared bat; Group 28 – Peregrine falcon and spotted bat

Source Habitat and Special Habitat Features

All species in this family use a variety of vegetation types and structural stages as their source habitat (Wisdom et al. 2000). Several of the species in this group have canyons, cliffs, or caves as a special requirement for roosting or nesting except the yellow warbler and spotted frog; and most require proximity to water to meet habitat needs. The Townsend's big-eared bat requires caves or mine shafts for roosting or hibernacula; the spotted bat uses cracks and crevices in cliffs and canyons; the peregrine falcon nests on cliff ledges generally near large bodies of water; the harlequin duck hens nest in cliff cavities or tree cavities near forested streams; the bald eagle builds nests in tall trees or cliffs near water; the yellow warbler is a riparian generalist that requires dense tall riparian shrubs for nesting and foraging;. Both bat species use riparian areas for foraging because of high insect density, the bald eagle uses water for hunting fish and waterfowl. Peregrines often include fish in their diet (although in Idaho they primarily eat small birds). The harlequin duck feeds on crustaceans and small fish and the yellow warbler eats caterpillars and spiders that are abundant in riparian thickets.

Yellow Warbler. Yellow warblers are primarily restricted to tall shrubby riparian communities that occur along rivers and streams, the edges of marshes and swamps, and leafy bogs because these habitats support a large variety of insects and provide suitable nesting habitat. Characteristics of good yellow warbler habitat include concealing cover for nesting, tall singing perches, and feeding areas in dense tall shrubs including willow, alder, and elderberry (Animaldiversityweb 2003; Cornell Lab of Ornithology web site 2003).

Columbia Spotted Frogs. The Columbia spotted frog is a highly aquatic species and nearly always is found in proximity to water, including lakes, ponds, slow streams, and marshes (Groves et al. 1997). Breeding habitats include a variety of relatively exposed, shallow-water (<60 cm), emergent wetlands such as sedge fens, riverine over-bank pools, beaver ponds, and the wetland fringes of ponds and small lakes (Nussbaum et al. 1983). Vegetation in the breeding pools generally is dominated by herbaceous species such as grasses, sedges *(Carex* spp.), and rushes *(Juncus* spp.). After breeding is completed, adults often disperse into adjacent wetland, riverine, and lacustrine habitats (Amphibiaweb, 2003). In the northern part of their range they are inactive during the winter, and most Columbia spotted frogs hibernate and aestivate.

Broadscale-Columbia River Basin and the Central Idaho ERU

Broadscale trends for species in the group are limited to Townsend's big-eared bat and the spotted bat. No broadscale trends are available for the other species due to fine-scale mapping characteristics of their source habitats (Wisdom et al. 2000). For the two bat species, basin-wide trends were mixed with the majority (47 percent) of watersheds

showing a neutral trend; 32 percent had declining trends. The Central Idaho ERU had an overall neutral trend with 34 percent of the watersheds reported as declining and 30 percent increasing. Basin-wide decreases in old-forest structural stages have been offset by increases in mid-seral stages (Hann et al. 1997). Riparian vegetation has declined in extent basin-wide (Lee et al. 1997).

S-CNF

Trends for the S-CNF are similar to the broad-scale trends for the basin and ERU, particularly the decline in riparian habitat across all land ownerships and large tree structures associated with riparian conditions. Special nesting and roosting requirements that depend on cliffs and crevices have probably not changed much from historic conditions; however, mine shafts increased in the late 1800s and early 1900s; suitable mine sites for roosting and wintering sites may have declined after the 1980s due to mine closures for safety reasons.

g) Family 8: Rangeland and Early- and Late-Seral Forest Family—Group 29 – Mountain bluebird;

Source Habitat and Special Habitat Features

Mountain bluebird. Mountain bluebird source habitat contains open woodland and conifer or edge habitats (Erlich et al. 1988). Family 8 in Wisdom et al. (2000) has only one species, the western bluebird whose habitat is represented by unique combinations of woodland, shrublands, grasslands, and early- and late-seral forests. The mountain bluebird has similar source habitat requirements including the use of burned forests and snags with cavities for nesting (Fire Effects Information System 2002; Hutto 1995).

Broadscale-Columbia River Basin and the Central Idaho ERU

Source habitats for family 8 have declined in 72 percent of watersheds (Wisdom et al. 2000). This decline has occurred in more than 50 percent of watersheds within most of the ERUs that provide source habitat for this species. The Central Idaho ERU had 79 percent of watersheds in decline, 15 percent neutral, and 6 percent increasing.

S-CNF

The S-CNF trends are similar to the basin and ERU declining trends. Ponderosa pine and dry Douglas-fir PVT early-seral and late-seral single-layer structural stages have declined and the multi-layer mid- and late-seral structural stages have increased. This loss of open and early-seral structural stages has caused a decline in source habitat for the mountain bluebird. The increase in multi-layer structural stages has resulted in the reduction of shrublands and edge communities because the forest structures are more homogeneous. Fewer acres of burned forest structure exist today than historic estimates, resulting in a decline in special features associated with mountain bluebird source habitat.

h) Family 10: Range Mosaic—Group 31 – Ferruginous hawk, burrowing owl, short-eared owl, vesper sparrow, lark sparrow, western meadowlark, and pronghorn

Source Habitat and Special Habitat Features

Source habitats for this group include various shrub, grass, and herbaceous cover types. All species in this group have source habitats in big sagebrush and fescue-bunchgrass cover types, six share low sagebrush, and five have source habitats in juniper/sagebrush, mountain big sagebrush, native forb, and wheatgrass bunchgrass types. Whereas particular

plant species may differ geographically, a key feature of this group is their preference for open cover types with a high percentage of grass and forbs in the understory. All species use the shrub component of the vegetation directly for nest sites, perch sites, or hiding cover (Wisdom et al. 2000).

Vesper Sparrow. Vesper sparrows are among the most widely distributed of the species in Group 31. Loss of large acreage of shrub-steppe and fescue-bunchgrass because of an increased fire frequency, cheatgrass invasion, brush control, and conversion to agriculture adversely affect vesper sparrows and other species in this group (Wisdom et al. 2000).

Pronghorn. The pronghorn is the least widely distributed species in the group. Pronghorn move into areas of higher shrub cover in the winter. They may depend on free water in the summers of dry years when they cannot meet water requirements from succulent forbs (Beale and Smith 1970; Clemente et al. 1995). However, in most years the availability of free water does not affect pronghorn habitat use (Deblinger and Alldredge 1991). Pronghorn numbers declined to near extinction because of indiscriminant hunting between 1850 and 1900, but have recovered dramatically since then (Wisdom et al. 2000).

Broadscale-Columbia River Basin and the Central Idaho ERU

Source habitats for family 10 have declined in 59 percent of Columbia Basin watersheds (Wisdom et al. 2000). This decline has occurred in more than 50 percent of watersheds within 10 of the ERUs that provide source habitat for this family. The Central Idaho ERU had 35 percent of watersheds in decline, 37 percent neutral, and 28 percent increasing. Wisdom et al. (2000) noted that the Central Idaho Mountains was the only ERU in the Columbia Basin where the number of watersheds with moderately or strongly declining trends in source habitats did not outnumber those with increasing trends. Increases were attributed to large relative increases in juniper/sagebrush, juniper woodlands, and low sagebrush, all of which covered only a small fraction of the unit.

S-CNF

The S-CNF trends are similar to the 65 percent of the watersheds within the Central Idaho Mountains ERU as being generally stable to slightly increasing. Loss of source habitat through agricultural conversion or cheatgrass invasion is rare on the Forest. The lack of fire has increased sagebrush density in some locations but is not widespread. Livestock grazing has also influenced the distribution of the shrub overstory with the herbaceous understory but this too is generally localized and not widespread.

i) Family 11: Sagebrush—Group 33 – Northern sage grouse (summer and winter), sage thrasher, Brewer's sparrow, sage sparrow, lark bunting, pygmy rabbit, and sagebrush vole.

Source Habitat and Special Habitat Features

The species in this group have source habitats in two structural stages of big sagebrush and mountain big sagebrush: open canopy, low-medium shrub and closed canopy, and low-medium shrub. Four of the species (pygmy rabbit, sagebrush vole, sage grouse, and sage sparrow) also have source habitats in both structural stages of low sagebrush. Habitats used by only a single species in the group include herbaceous wetlands used by sage grouse.

Sage Grouse. Sage grouse were discussed in Section 3.C.3.c.

Pygmy Rabbit. The pygmy rabbit is uniquely dependent on sagebrush, which comprises up to 99 percent of its winter diet. It is one of only two North American rabbits that digs its own burrows. It is a strict sagebrush obligate, inhabiting sagebrush-dominated habitats in the Intermountain Region and Great Basin. Pygmy rabbits are one of a very few species, including pronghorn antelope and sage grouse, that can ingest large amounts of sagebrush leaves laden with terpenoids without major digestive disturbances and death (White et al. 1982, Katzner 1994).

The pygmy rabbit is an extreme habitat specialist at all levels, from the landscape level to placement of burrows and use of surrounding areas (Gabler 1997, Heady 1998, Heady et al. 2001). It is closely associated with clumps of tall dense sagebrush coupled with deep loose textured soils for burrow construction. Herbaceous vegetation is also important to pygmy rabbits (Lyman 1991), which augment their sagebrush diet with forbs and grasses. An understory composed of native grasses is believed important for most species in this group (Bock and Bock 1987; Connelly et al. 1991; Cooper 1868; Dobler et al. 1996; Gregg 1991; Hall 1928; Mullican and Keller 1986). Pygmy rabbits choose tall dense sagebrush for their burrows. Wisdom et al. (2000) assumed that this vegetation cover, which provides protection from predators, is important and that areas of bare ground would be avoided.

Habitat fragmentation readily isolates populations, as disruptions in sagebrush cover and open areas provide barriers to dispersal. The pygmy rabbit has very limited dispersal abilities and is reluctant to cross open areas, amplifying the effects of fragmentation.

Broadscale-Columbia River Basin and the Central Idaho ERU

Source habitats for family 11 have declined in 49 percent of Columbia Basin watersheds (Wisdom et al. 2000). This decline has occurred in more than 50 percent of watersheds within six of the 13 ERUs that provide source habitat for this species. The single largest loss in cover types within the basin was the decline in big sagebrush (Hann et al. 1997). The Central Idaho ERU had 42 percent of watersheds in decline, 30 percent neutral, and 27 percent increasing. Wisdom et al. (2000) indicates that sage grouse have been eliminated from five of the Basin ERUs and that populations are disjunct in three more of the 13 ERUs.

S-CNF

The S-CNF trends are similar to the 57 percent of the watersheds within the Central Idaho Mountains ERU as being generally stable to slightly increasing. Agricultural conversion is rare and conversion to cheatgrass from disturbance is not widespread. The lack of fire and livestock grazing has altered the proportion of the shrub overstory to the herbaceous understory, although this too is generally localized and not widespread. There has been some reduction of late seral riparian communities from lack of fire, livestock grazing, and altered stream flows from diversions, most notably in the more gentle, lower elevations of the Forest.

3.C.4. Ecosystem Function

Key ecosystem functions are processes that limit or control biological diversity, resilience to disturbance, and biotic productivity (Quigley and Arbelbide 1997). These include energy flow, the hydrologic cycle, the carbon and nutrient cycles, ecosystem food webs, and evolution. The energy flow function operates mostly at the global scale and evolution is

more directly tied to long-term change. The hydrologic cycle, carbon and nutrient cycles, and ecosystem food webs are most closely tied to regional/local scales and are addressed in this document. Native plant communities on the S-CNF positively affect these cycles by contributing to available water storage and subsequent groundwater discharge during drier times of the year, the beneficial use of space and nutrients, and enhanced plant diversity, complexity, and ecosystem viability. Current weed infestations on the S-CNF affect each of these cycles to some degree in localized areas by decreasing available water storage and subsequent groundwater discharge, outcompeting native plant species for space and nutrients, and eliminating plant diversity, thus reducing the complexity and viability of the ecosystem food web.

Hydrologic Cycle. Native plant communities on the S-CNF positively affect the hydrologic cycle, which involves the movement of water and its associated nutrients and energy. Water evaporates from water bodies (hydrosphere), precipitates over terrestrial areas, enters fluvial systems via runoff and groundwater discharge, and returns to the ocean. Native plant communities on the S-CNF benefit this cycle through the presence of a diversity of species that provide ecosystem complexity and stability, multiple complex canopies and root structures, uninhibited infiltration of water into the soil, minimization of sediment delivery to drainages, and a high soil water-holding capacity. Healthy riparian systems in native plant communities typically exhibit a sponge effect, storing water early in the year then discharging it as late-season base flows to streams that provide year-round habitat for aquatic resources. In contrast, weed infestations on localized areas of the S-CNF can affect hydrologic function through changing vegetation patterns, which in turn change the way water moves through the S-CNF. As diverse, multi-layer native plant communities are changed to monotypic (one species) weed stands having only a single canopy layer and simplified root structures, the patterns of runoff change. Infiltration of water into the soil tends to decrease, increasing the risk of "flashy" runoff events and increased potential for sediment delivery to streams. Water storage in the soil is reduced and late-season stream flows can decrease as late-season groundwater discharge slows from historical conditions. As noted previously, riparian systems are particularly important since they store water from spring runoff and slowly release it the rest of the growing season. Transpiration, the return of water vapor to the atmosphere from plant metabolism, also decreases as the plant community changes to less diverse populations.

Carbon and Nutrient Cycles. Healthy native plant communities on the S-CNF provide continuous carbon and nutrient cycling through plant productivity, mortality, and decomposition. These cycles are closely tied to the hydrologic cycle, as primary productivity is dependent on water. Fire is important to this cycle, because fire rapidly releases nutrients and carbon into the ecosystem. The carbon and nutrient cycles determine the productivity of biotic systems. The ability of a natural community to recover from disturbance is dependent on the level of productivity inherent to a community. Weed infestations on localized areas of the S-CNF can influence carbon and nutrient cycles in a variety of ways through disruption of native plant communities. Less diverse plant communities will have lower rates of carbon production and decomposition, leading to reduced carbon and nutrient cycles.

Ecosystem Food Webs. As native plant communities (primary producers) increase in complexity on the S-CNF, the base of the food web also increases in complexity as well as

stability and sustainability. This increased complexity in the food web base ripples throughout the food chain by providing higher levels of inputs and increased structure to support higher levels of organisms. Weeds tend to lower the complexity of plant communities and thus the ability to support a diversity of higher level organisms. Health of plant communities also depends on a healthy soil environment. Reductions in water infiltration and reduced amounts of organic matter stored in the soil through reduced decomposition rates, as a result of weed infestations on localized areas of the S-CNF, reduce soil health and subsequently reduce the rate of primary productivity.

3.D. Physical Resources

3.D.1. Surface Water

a. Hydrology

Watersheds on the S-CNF annually contribute an average of more than 2 million acre-feet of water to the Pacific Northwest River Basin System. Nearly all of the S-CNF's watersheds are tributary to the Salmon River, which empties to the Snake River and then the Columbia River. Major drainages on the S-CNF include the Panther Creek watershed, the entire North Fork of the Salmon River, nearly all of the major tributaries to the Lemhi River, some of the headwater tributaries to the Pahsimeroi River, much of the Middle Fork of the Salmon River, the Yankee Fork of the Salmon River, and numerous drainages that empty directly into the Salmon River. The S-CNF also contains some headwaters of the Big Lost and Little Lost River Systems, which sink into the upper Snake River Plain Aquifer. Surface water flows in S-CNF drainages are dominated by snowmelt from May through June, with peak flows occurring in late June and base flows occurring from late summer into winter. Drainage patterns are typically dendritic or "leaf vein" as streams flow from their sources down to the valley bottoms. All the watersheds on the S-CNF include the headwaters (source stream reaches), which then become lower-gradient transport stream reaches. Relatively few miles of low-gradient streams (response stream reaches) occur on the S-CNF compared to the higher-gradient transport and source stream reaches.

b. Water Quality

Most surface waters on public land fully support designated beneficial uses as defined by the State of Idaho. The principal and typically the most limiting beneficial uses are cold water biota, salmonid spawning, domestic water supply, and primary and secondary contact recreation. Other beneficial uses include wildlife habitats and aesthetics. The water quality of the streams on the S-CNF is influenced by the geology of the area. For example, streams originating in the quartzite rocks of the Lemhi Range have lower dissolved solids than streams originating in the carbonate rocks of the Lost River Range. The upper reaches of the Salmon River flow through a highly mineralized zone, causing a naturally high level of metals in the watershed. Improper practices associated with past mining and logging activities in the upper reaches of the Salmon River watershed have contributed to increased levels of toxic metals and sediment, respectively, and have been shown to destroy spawning habitat and adversely affect naturally occurring riparian habitat.

In lower-elevation valleys on the S-CNF and downstream of the S-CNF, water quality varies with the time of year and extent of human use. Most pollutants are from nonpoint sources;

in other words, no one single location or activity can be identified as the source. Generally, sedimentation from nonpoint sources like irrigated crop production, rangeland, pastureland, streambank modification, and roads is the primary pollutant of concern. Nutrients from cropland and pastureland, as irrigation return flows, are also identified as concerns.

Diversions are common along the lower reaches of the Salmon River and its tributaries. These diversions commonly affect the annual flow of the rivers; as a result some streams do not flow year-round. Other streams are affected by the region's dry climate; many smaller watersheds are entirely dependent on winter snows and spring rains for streamflow, and dry up by late summer. Two watersheds within the Forest provide municipal water – Jesse Creek for Salmon and Garden Creek for Challis.

c. 303(d) Stream Segments

The State of Idaho has designated water quality limited stream segments within the S-CNF. This designation is required by the Clean Water Act pursuant to §303(d). States are required to submit this list to the EPA every 2 years. The list represents a comprehensive status of water quality in Idaho. Streams, rivers, lakes, and reservoirs are evaluated for this list. The DEQ compiles a list of streams that are designated "water quality limited."

Forty-four stream segments within S-CNF boundaries and one lake that borders the S-CNF have been designated under §303(d). Primary pollutant concerns are sedimentation, elevated temperature, and nutrients. Sources of these pollutants include roads, runoff from concentrated livestock use, and streambank erosion. Water quality in these streams could also potentially be affected by runoff from weed control efforts such as herbicides if not applied properly, prescribed burning activities, and grazing. Elevated metals levels and habitat or flow alteration are concerns in some drainages. Table 3-16 identifies the boundaries/locations of stream segments and lake that have been designated on the State of Idaho Year 1998 303(d) list. Appendix I presents information on the miles of 303(d) streams on the S-CNF by Ranger District and HUCs 4 and 5.

TABLE 3-16
Water Bodies on the S-CNF Designated as "Water Quality Limited"

Water Body/Sub-basin	Boundaries	Pollutants
Upper Salmon River Sub-basin		
Salmon River	Redfish Lake Creek to East Fork Salmon River	Sediment, temperature
Squaw Creek	Headwaters to mouth	Temperature
Thompson Creek	Scheelite Jim Mill Site to Salmon River	Metals, sediment
Yankee Fork	Jordan Creek to Salmon River	Habitat, sediment
Yankee Fork	Fourth of July Creek to Jordan Creek	Habitat, sediment

TABLE 3-16
Water Bodies on the S-CNF Designated as "Water Quality Limited"

Water Body/Sub-basin	Boundaries	Pollutants
Middle Salmon-Panther Sub-basin		
Big Deer Creek	Big Deer Creek South Fork to Panther Creek	Metals, pH, sediment
Blackbird Creek	Blackbird Creek Reservoir to Panther Creek	Metals, pH, sediment
Bucktail Creek	Headwaters to South Fork Big Deer Creek	Metals
Diamond Creek	Headwaters to Salmon River	Unknown
Dump Creek	Headwaters to Salmon River	Sediment
Panther Creek	Blackbird Creek to Salmon River	Metals
Salmon River	Pahsimeroi River to Salmon River–North Fork	Unknown
Williams Lake		Dissolved oxygen, nutrients
Upper Middle Fork Salmon Sub-basin		
Elkhorn Creek	Headwaters to Middle Fork Salmon River	Flow alteration, sediment, temperature
Middle Salmon-Chamberlain Sub-basin		
Salmon River	Corn Creek to Cherry Creek	Unknown
Lemhi River Sub-basin		
Bohannon Creek	Headwaters to Lemhi River	Temperature
Cruikshank Creek	Creek Headwaters to Canyon Creek	Unknown
Kenney Creek	Headwaters to Lemhi River	Temperature
Kirtley Creek	Headwaters to Lemhi River	Temperature
Little Eightmile Creek	Headwaters to Lemhi River	Temperature
Sandy Creek	Headwaters to Lemhi River	Temperature
Short Creek	Headwaters to Bear Valley Creek	Unknown
Wimpey Creek	Headwaters to Lemhi River	Temperature
Little Lost River Sub-Basin		
Barney Creek	Headwaters to mouth	Temperature
Basin Creek	Headwaters to mouth	Temperature
Big Creek	Headwaters to mouth	Temperature
Big Springs Creek	Headwaters to mouth	Temperature
Coal Creek	Headwaters to mouth	Temperature
Deer Creek	Headwaters to mouth	Temperature

TABLE 3-16
Water Bodies on the S-CNF Designated as "Water Quality Limited"

Water Body/Sub-basin	Boundaries	Pollutants
Dry Creek	Headwaters to mouth	Temperature
Iron Creek	Headwaters to mouth	Temperature
Mill Creek	Headwaters to mouth	Temperature
Sawmill Creek	Mill Creek to Little Lost River	Sediment, temperature
Smithie Creek	Headwaters to mouth	Temperature
Squaw Creek	Headwaters to mouth	Temperature
Summerhouse Canyon	Headwaters to mouth	Temperature
Summit Creek	Headwaters to mouth	Temperature
Timber Creek	Headwaters to mouth	Temperature
Wet Creek	Coal Creek to Little Lost River	Flow alteration, sediment, temperature
Williams Creek	Headwaters to mouth	Temperature
Big Lost River Sub-basin		
Leadbelt Creek	Headwaters to mouth	Temperature
Little Boone Creek	Headwaters to East Fork Big Lost River	Unknown
Twin Bridges Creek	Headwaters to Big Lost River	Nutrients, sediment
East Fork Big Lost River	Starhope Creek to Forks	Habitat alteration
East Fork Big Lost River	Headwaters to Starhope Creek	Sediment, temperature

3.D.2. Groundwater Resources

a. Drinking Water Quality

Groundwater status in the upper reaches of the S-CNF is unknown. Many of the smaller tributaries are generated from springs, but the interactions among surface water, rate of movement, and sub-surface flows are unknown. In the valley bottomlands, some groundwater is mineralized (as in the Pahsimeroi Basin), but is generally potable. The Lemhi River originates from springs in the Lemhi Range, but little is understood about the relationship between groundwater and surface water. There are only seven deep groundwater wells used for irrigation in the Lemhi Basin.

3.D.3. Soils, Geology, and Minerals

a. Soils

Soils are an important consideration in managing weeds because soil and herbicides interact and weed infestations can affect the quality of the soil. From a herbicide interaction standpoint, important soil characteristics include soil texture (e.g., relative amounts of sand, silt, and clay particles less than 2 mm in size), the amount of coarse fragments greater than 2 mm, amount of organic matter, and soil permeability (the ease with which water moves though the soil). These soil characteristics control processes that affect herbicide behavior in soils. According to Donigian and Rao (1987), soil processes that affect the distribution and fate of chemical herbicides can be grouped into five categories as follows:

- Transport—affects herbicide movement through volatilization, runoff, erosion, and leaching
- Sorption and Partitioning—affects herbicide leaching rate through adherence to soil or organic matter particles
- Transformation and Degradation—affects persistence of herbicides in soil by changing to another chemical form
- Volatilization—chemical vapor from herbicides is lost through the soil or plants
- Root Uptake—herbicides are bioaccumulated, metabolized, or degraded in plants after root uptake

From a soil quality standpoint, weed dominance of a site can result in reduction of soil cover, biomass production, and accumulation of soil organic matter (U.S. Forest Service 2001a). As weeds take over a site, erosion rates increase, soil biochemical processes change, soil organism habitat is altered, and soil quality and soil productivity decline (Willard et al. 1988). These effects are a result of weeds replacing multi-canopy, diverse native vegetation stands with a one-species stand of weeds.

Soils on the S-CNF are derived from quartzites, granitic rock, volcanic rock, and sedimentary rock. Soils derived from different rock types have different properties, in general, relative to the soils' interaction with herbicides and in response to weed management activities. Clay content is important to leaching of herbicides through the soil profile. The higher the clay content, the less likely herbicides will leach into groundwater. However, if the clay layer is too close to the surface, precipitation cannot infiltrate into the soil and runoff of herbicide-laden water is possible. The amount of coarse fragments greater than 2 mm in the soil, such as gravels, cobbles, and stones, is also important. On average, all soil types on the S-CNF have moderate amounts of coarse fragments. Coarse fragment percentages greater than 35 percent are common. Volcanic and quartzite soils tend to have higher percentages with as much as 60 to 80 percent of the soil volume being fine gravel, cobble, and stone in some locations. Sedimentary and granitic soils tend to have lower coarse fragment content, with percentages below 10 percent not unusual. The higher the percentage of coarse fragments, the higher the infiltration rate is likely to be. However, coarse soil fragments (greater than 2 mm in size) and soil texture (particles less than 2 mm in size) can interact and/or counteract infiltration to an extent. For example, high infiltration rates due to a high percentage of coarse soil fragments can be reduced if the soil matrix has a

fine texture, and vice versa. Generally on the S-CNF, the percentage of coarse soil fragments (greater than 2 mm) is highest in quartzite soils, intermediate in granitic and volcanic soils, and lowest in sedimentary soils. Soil textures (less than 2 mm) would be most coarse in granitic soils, less coarse in quartzite soils, even less coarse in sedimentary soils, and finest in volcanic soils.

A high infiltration rate can potentially carry herbicides through the soil and into groundwater. However, soils with higher percentages of coarse fragments may be less susceptible to erosion than those where fine-textured soil particles dominate (e.g., silts and clays). In general, soils derived from granite and quartz have a lower clay content. Volcanic and sedimentary soils are more likely to have higher clay content. The majority of granitic soils have clay content in the 5 to 10 percent range. Volcanic soils may have clay content in the 10 to 15 percent range, but may have clay contents in excess of 20 percent. These soils are very resistant to erosion. Other volcanic and sediment-derived soils have clay contents in excess of 35 percent with few coarse fragments. These soils have slow infiltration rates and would not allow for much vertical movement of herbicides. Appendix I presents information on soils types on the S-CNF by Ranger District and HUCs 4 and 5.

Map 3-10 (back of chapter) depicts the geologic-derived soil types on the S-CNF. Very generally, the most frequently occurring predominant soil types by Ranger District tend to consist of the following: Challis Ranger District (volcanic, sedimentary, and quartzite); Leadore Ranger District (quartzite); Lost River Ranger District (sedimentary); Middle Fork Ranger District (volcanic and quartzite); North Fork Ranger District (quartzite and granitic); Salmon-Cobalt Ranger District (volcanic, quartzite, and granitic); and Yankee Fork Ranger District (volcanic, quartzite, and sedimentary).

b. Geology

The major landforms in the S-CNF are dissected mountains, breaklands, canyons, basins, foothills, and valleys. Bedrock and surface materials are granite formations with gneiss, schist, carbonate rocks (like the limestone cliffs along the Salmon River), and volcanic rocks. These mountains are major sources of minerals and sediments in the S-CNF.

Quigley and Arbelbide (1997) note three geological influences in the area: the Idaho Batholith, Tertiary (Challis) volcanics, and the sedimentary mountains of the Beaverhead Range. The Idaho Batholith is a large granite formation that runs through central Idaho and covers much of the S-CNF. It is characterized by high mountains of igneous granite, metamorphic rock, and some sedimentary rock. The Bitterroot Mountains, Sawtooth Mountains, Salmon River Mountains, and the Lemhi Range are characteristic of this feature. These mountains have been modified by wind erosion, glacial activity, and water to form high, craggy peaks. Structurally, the range fronts of these mountains are bounded by faults. Transverse faulting occurs throughout the S-CNF. The S-CNF is also characterized by the "basin and range" fault block valleys. Broad valleys are bordered by steep, narrow mountain ranges that extend like fingers into the basaltic plains of southern Idaho. The southern geology of the S-CNF is influenced by the Batholith and volcanic activity. The northern and eastern borders of the S-CNF are dominated by the Batholith, the Bitterroot Range, and the lakebed sediments of the Beaverhead Range and foothills.

c. Minerals

Significant production of gold, silver, uranium, tungsten, flourspar, molybdenum, lead, zinc, cobalt, and copper has occurred within the S-CNF. Bentonite also occurs within the S-CNF. The Challis Ranger District has sites suitable for sand and gravel removal, and some oil and gas leasing has occurred in the past. However, current mineral development is limited by environmental concerns and low market prices.

3.D.4. Land Uses and Designations

This section presents information on commercial and recreational land uses as well as special land use designations on the S-CNF, which are depicted on Map 3-11 (back of chapter). Information on noxious weed management, direction, and philosophies on the S-CNF together with land use plans and relevant laws, regulations, and policies were described in Chapter 1 of this Final EIS.

a. Commercial Uses

Historically, commercial uses on S-CNF lands have been limited to timber harvesting, mining, and agriculture/livestock grazing. A recent trend toward recreation/tourism supports a growing outfitting and guide economy, discussed below in *Section 3.D.4.b, Recreation Uses*.

Agriculture/Livestock Grazing. Grazing has been an important part of the area's commercial viability since the late 1800s. Grazing on public lands continued unregulated until 1905, when the Forest Service began its strategy of individual allotments and grazing systems. There are 113 livestock grazing allotments on the S-CNF, 92 percent of which are cattle and horse permits while 8 percent are sheep permits with a total licensed grazing use of approximately 156,600 Animal Unit Months (AUMs). These allotments cover approximately 80 percent of the S-CNF leaving the remaining 20 percent unallocated to livestock grazing. Agriculture, primarily in the form of livestock production, remains an economic force in the communities surrounding the S-CNF. This use is affected by terrain, access, vegetation, and water availability. Grazing on the S-CNF can have mixed effects: while some grazing has been shown to decrease noxious weed populations, the movement of livestock in and out of grazing use areas also contributes to the invasion of noxious weeds.

Mining. Mining has played a significant role in the historical and present economic viability of the area. Mining played a role in the agricultural development of the lower valleys, and contributed to the growth of towns along freight roads designed to supply mines. Mines and abandoned claims dot the upper elevations of the S-CNF, but large-scale production has been curtailed by depressed prices, limited deposits, and environmental concerns. Currently, the Thompson Creek Mine in Custer County extracts molybdenum. Hecla operated a gold mine in Lemhi County until mid-2001. Smaller mining operations continue. Reclamation activities at Blackbird Mine, the Hecla site, and other sites continue to provide some economic benefit to the area. Many of the abandoned mining sites are infested with weeds due to extensive surface disturbance.

Timber. Large- and small-scale timber removal activities have occurred throughout the S-CNF. Forest resources were harvested for posts, poles, house logs, saw timber, and mining

timbers. Currently, timber is harvested for personal use (e.g., firewood and pole cutting) and commercial use. Because of site disturbance and increased access, these logged areas are likely more susceptible to weed invasion.

b. Recreation Uses

Recreation occurs on nearly all areas within the S-CNF, both on the land and rivers. The patterns of land recreation use are relatively stable. Summer is the busiest season. Recreational uses support a strong tourist-based economic segment. Outfitters and guides use lands and rivers within the S-CNF for rafting, hunting, and fishing opportunities. Local businesses increasingly rely on these uses as well as private individuals using the S-CNF.

Recent travel surveys indicate that 90 percent of travelers return to areas in and around the S-CNF after their initial visit (Idaho Department of Commerce 2000). Hunting and fishing account for more than $340 million a year in the State of Idaho (Idaho Department of Fish and Game 1999). Much of this activity occurs in the central mountains of Idaho, including lands on the S-CNF. In addition, tourism accounts for more than $200 million each year in central Idaho (Blaine, Custer, Lemhi, Butte, and Camas Counties) alone (Runyan et al. 1999). Tourism supplies more than 600 jobs in Custer County, and more than 200 in Lemhi County, with a smaller number (lees than 50) in Butte County (Runyan 1999). Visitors spent more than 1.7 billion dollars in Idaho in 1997.

Most of the recreation use occurs within the river corridors and is primarily associated with whitewater floating, motor boating, and fishing. Most use of aircraft landing strips located near the Middle Fork and Salmon Rivers is associated with river activities and ingress/egress to private lands. The landing strips provide airplane access for commercial and noncommercial river recreation during low water periods (mid to late season on the Middle Fork) or takeouts (i.e., Mackay Bar on the Salmon River).

Outside of the river corridors, typical summer activities include hiking; camping; fishing in the mountain lakes and streams; horse packing and horseback riding; rock climbing; berry picking; sightseeing; exploring; and scouting for fall hunting trips. Many visitors fly into the backcountry landing strips to camp, hike, and explore. Crowding at some high mountain lakes and landing strips occurs periodically from the time the snow melts off the high country until Labor Day weekend in September. During the fall, floating sharply declines while fishing and hunting activities increase substantially. Trailheads are often filled to capacity or overflowing, and travel on roads leading to trailheads can be a challenge. In the spring, use increases with antler hunting, camping, photography, hiking in the lower elevation river canyons, bear hunting, and mushroom picking. Winter use is lower, with a small number visiting for backcountry skiing, snowshoeing, winter camping, enjoying hot springs, and cougar hunting. At this time of year, opportunities for solitude and outdoor recreational challenges are the greatest.

Recreationists, private land owners, and others use the trail system for access to the S-CNF and private inholdings for a variety of reasons. S-CNF personnel use the trails for fire control, trail maintenance, special use administration, facility access, resource monitoring, and general patrolling of the area. Commercial outfitters, hunters, fishermen, and other recreationists are some of the other main trail users. Most trail users travel by foot or pack

and saddle stock. Noxious and invasive weeds have established themselves along many of these trails, likely adversely affecting the recreation experience.

c. Wilderness, Research Natural Areas, and Roadless Areas

Wilderness Areas. The FCRONRW, depicted on Map 3-11, is not a part of this Final EIS. In 1999, the Forest Service (1999b) issued its noxious weed treatments Final EIS for the FCRONRW. Copies of that Final EIS are available at the S-CNF Office in Salmon, Idaho.

Research Natural Areas. Map 3-11 depicts RNAs within the S-CNF. An RNA is an area reserved for scientific research and education. The focus of RNA designation is on maintaining ecosystem processes with emphasis on rare or unique vegetation characteristics. It is not promoted for general recreation use. The RNA designation prevents actions against "insects, diseases, wild plants, or animals unless the Regional Forester and Station Director deem such action necessary to protect the features for which the [RNA] was established or to protect adjacent features. If exotic plants or animals have been, or are, introduced into the RNA, the Station Director and the Regional Forester shall exercise control measures that are in keeping with the established management principle and standards to eradicate them, when practical." (Challis Forest Plan, as amended 1992a). The area of the former Challis National Forest has eleven RNAs: Iron Bog and Meadow Canyon (1981); Soldier Lakes, Surprise Valley, Merriam Lake Basin; Smiley Mountain; and Mahogany Creek (1992); and Sheep Mountain, Cache Creek Lakes, and Mystery Lake (1996); and Middle Canyon. The area of the former Salmon National Forest designates nine RNAs: Allan Mountain, Kenny Creek, Davis Canyon, Dry Gulch-Forage Creek; Frog Meadows, Mill Lake, Bear Valley; Colson Creek; and Dome Lake Creek (Salmon Land and Management Plan, as amended April 1996). Appendix I presents information on acres of RNAs on the S-CNF by Ranger District and HUCs 4 and 5. The extent of weeds on the numerous RNAs has not been summarized, however comparing the individual HUCs from Appendix I and Appendix B gives an idea of the likelihood of weeds being present in a particular RNA.

Roadless Areas. Several areas within the more remote reaches of the S-CNF have been inventoried as roadless areas (depicted on Map 3-11); others have been identified as potential roadless areas. Recently, the U.S. Department of Agriculture promulgated new regulations about development of these areas (66 FR 3244). The Forest Service is now required to limit development of roads within these areas, concluding that such protection is "necessary to protect the social and ecological values and characteristics of inventoried roadless areas from road construction and reconstruction and certain timber harvesting activities. Without immediate action, these development activities may adversely affect watershed values and ecosystem health in the short and long term, expand the road maintenance backlog which would increase the financial burden associated with road maintenance, and perpetuate public controversy and debate over the management of these areas."

The Forest Service also recognized the value of these roadless areas to the diversity of plant and animal communities. The Forest Service concluded that inventoried roadless areas "conserve native biodiversity by serving as a bulwark against the spread of nonnative invasive species." (66 FR 3244). Appendix I presents information on acres of all inventoried roadless areas on the S-CNF by Ranger District and HUCs 4 and 5.

Inventoried roadless areas within the S-CNF where road construction and reconstruction is not allowed include portions of the North Fork, Salmon-Cobalt, and Leadore Ranger Districts that total approximately 329,000 acres. Some of the worst weed infestations (spotted knapweed) occur in the northern part of the S-CNF in the North Fork Ranger District. However, these infestations are generally outside of or adjacent to designated roadless areas in this Ranger District. These roadless areas tend to have fewer occurrences of noxious weed invasions than areas where road construction and reconstruction is allowed.

Lewis and Clark Trail Management Area. The Salmon Land and Resource Plan was amended in July 2000 to include management strategies for the Lewis and Clark Trail. The plan sets aside known trails used by the Corps of Discovery in preparation for the bicentennial anniversary of the expedition (2003 to 2006). The spread and control of noxious weeds is an important management goal. Any noxious weed management alternative must include tasks that will, as required by the plan, preserve the natural character of the Trail.

d. Wild and Scenic Rivers

The Middle Fork of the Salmon River (in the FCRONRW) was one of the first rivers in the U.S. to be designated as a Wild and Scenic River. In 1980, the Main Salmon from the North Fork downstream to Long Tom Bar was designated Wild and Scenic. Eligibility for "outstandingly remarkable" (OR) consideration was reevaluated across the Forest from 1989 through 1992. Seven resources were evaluated for possible OR values, any one of which would designate it as eligible for further consideration for designation. These seven resources are: Scenic (Sc), Recreation (Rec), Fish (F), Wildlife (WL), Geologic (Geo), Cultural Resources (CR), and Ecological (Ecol). Table 3-17 identifies the segments/locations of rivers and creeks that have been designated or deemed eligible for further consideration for designation, including those on the FCRONRW. Map 3-11 depicts wild and scenic river segments according to the alphabetized codes listed in Table 3-17. Appendix I presents information on the extent of designated wild and scenic rivers on the S-CNF by Ranger District and HUCs 4 and 5. There are no indications suggesting that weeds or weed treatments on the S-CNF have affected the wild and scenic rivers designation or eligibility characteristics. However, weeds have expanded as a result of increased river-based recreational activities.

3.D.5. Visual Resources

Scenery, the general appearance of a place and the arrangement of its individual features, is an important resource in the S-CNF. According to Quigley and Arbelbide (1997), viewing scenery is one of the highest ranked recreational activities in the Northwest. This demand is not limited to viewing alone; significant numbers of people who hunt, fish, and participate in other "consumptive" recreation activities value scenery highly and choose their recreation sites for scenery and aesthetic qualities as well as abundance of fish and game. The S-CNF's dry climate and predominantly sunny days provide unparalleled views.

These views are sometimes impaired by smoke from fires or dust from road use or agricultural activities. Weeds are also known to have the potential to impair the visual resources of the area. Except for weeds with massive floral displays, most invasive weeds affect foreground viewing. Primary travel corridors like highways, forest roads, trails, and river banks are most vulnerable to the introduction of invasive weeds.

TABLE 3-17
Status of Eligible Streams Under the Wild and Scenic Rivers Act

	Stream	Designation[1]	Segment	Miles	Outstandingly Remarkable (OR) Value[2]
Designated					
	Salmon (Main) River	Recreation	North Fork to Wheat Creek	46.8	
		Wild	Wheat Creek to Long Tom Bar (within FCRONRW)		
	Middle Fork Salmon River	Wild	Marsh/Bear Valley Creeks to confluence with Main Salmon (within FCRONRW)		
Eligible for Designation					
a[3]	Salmon (Main) River		North Fork upstream to 4th of July Creek	4.0	Sc/Rec
b	Camas Creek		Headwaters to mouth	13.1	F/WL/Sc/Rec
c	Panther Creek		Headwaters to mouth	44.0	Sc/Rec/F/WL/ Geo
d	Bear Valley Creek		Headwaters to mouth	10.0	Rec/F/WL/Ecol
e	Hayden Creek		Headwaters to S-CNF boundary	11.9	Rec/F/WL
	Loon Creek		Within FCRONRW		
	Loon Creek		Within FCRONRW		
f	Yankee Fork (A)		Headwaters to Salmon River	2.5	Rec/Geo
g	Yankee Fork (B)		Headwaters to Salmon River	6.5	CR
h	Yankee Fork (C)		Headwaters to Salmon River	6.5	CR
	Marsh Creek (A)		Within FCRONRW		
l	Marsh Creek (B)		Headwaters to FCRONRW boundary	4.5	Sc/Geo
j	East Fork Pahsimeroi River		Headwaters to confluence with West Fork	4.5	Sc/Geo
	West Fork Camas Creek		Within FCRONRW		
	Soldier Creek		Within FCRONRW		
	Muskeg Creek		Within FCRONRW		
	Rapid River		Within FCRONRW		
	Warm Springs Creek		Within FCRONRW		
k	Fall Creek		Headwaters to Wildhorse Creek	8.1	Sc

TABLE 3-17
Status of Eligible Streams Under the Wild and Scenic Rivers Act

	Stream	Designation[1]	Segment	Miles	Outstandingly Remarkable (OR) Value[2]
l	Summit Creek		Headwaters to near Trail Creek Summit	3.7	Sc
m	Lower Cedar Creek		Headwaters to S-CNF boundary	4.5	Geo
n	West Fork Yankee Fork		Headwaters to Yankee Fork	11.5	Sc
o	Kane Creek		Kane Lake to Summit Creek	9.1	Sc
p	Star Hope Creek		Headwaters to W. Fork Big Lost River	5.1	Geo
q	Muldoon Creek		Headwaters to West Fork of East Fork Big Lost River	9.3	Geo
r	Wildhorse Creek		Arrowhead Lake to Wildhorse Campground	5.9	Sc
s	Pahsimeroi River		Confluence of East and West Forks to S-CNF Boundary	1.5	Sc/Geo
t	Mill Creek		Headwaters to S-CNF boundary	10.5	CR
u	East Fork Big Lost River		Headwaters to S-CNF boundary	25.5	Sc/CR/Geo
v	West Fork Big Lost River		Confluence with Star Hope and Muldoon Creeks to East Fork of Big Lost River	10.2	Geo
w	Lake Creek		Headwaters to West Fork of East Fork Big Lost River	8.1	Sc/Rec
x	Pass Creek		Below private land in Section 2 to S-CNF boundary	2.4	Sc/Geo

[1]Designation Definitions:

Recreation (Rec)—Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

Scenic (Sc)—Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

Wild—Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

[2]OR Value Acronyms: CR = Cultural resources; Ecol = Ecological; F = Fish; Geo = Geologic; Rec = Recreation; Sc = Scenic; WL = Wildlife.

[3]**See Map 3-11 for corresponding wild and scenic river segments.

3.D.6. Air Quality and Noise

a. Air Quality

Air quality within the S-CNF is generally excellent. Some seasonal air quality degradation occurs during the fire season. In populated areas like Salmon, Challis, or Stanley, some winter degradation occurs from wood burning heaters combined with temperature inversions. These weather conditions usually last no more than a few days; air degradation is temporary. Dust from vehicular traffic on unpaved roads or wind disturbance also contributes to air pollution. In all cases, the primary pollutant is particulate matter. Pollutants rarely persist and are usually dispersed by prevailing winds.

b. Noise

Generally, noise levels are within acceptable levels within the S-CNF. Exceptions to this rule may include hunting and grazing activities that involve mechanized transportation. Mining and timber harvesting activities also affect noise levels.

3.E. Human and Socioeconomic Resources

3.E.1. Human Health and Safety

a. Public Health and Safety

The presence of noxious and invasive non-native weeds on the S-CNF are not known to have directly or indirectly affected human health and safety, and they do not pose significant health threats to a large segment of the population. Some weeds present on the S-CNF, such as tansy ragwort and St. Johnswort, can reportedly make people sick if ingested in large amounts, while other weed species may cause minor skin irritations or allergic reactions via their pollen. Dense infestations of Canada, musk, and other thistles can cause minor scrapes or irritate visitors' skin, but they are not known to cause lasting human health effects (U.S. Forest Service 2000b; 2001d). Hand-pulling weeds without the aid of gloves can cause minor skin irritations. Callihan et al. (1991, in U.S. Forest Service 2001d) stated that leafy spurge contains a latex-bearing sap that can irritate human skin and cause blindness in humans on contact with the eyes. The sap of Russian knapweed contains a known carcinogen, and Niehoff (1997, in U.S. Forest Service 2001d) reported that spotted knapweed sap also may be carcinogenic.

There have been no reported instances that past weed control efforts on the S-CNF, including the use of herbicides, have affected public health and safety. Areas treated with herbicides on the S-CNF in recent years have generally increased annually from approximately 580 acres in 1995 to approximately 3,370 acres in 2001. Precautions and notifications described in Chapter 2 are intended to avoid or mitigate any potential hazards to public health and safety from the treatment of noxious weeds. Potential effects of the proposed project on public health and safety are described in Chapter 4 of this Final EIS.

b. Worker Health and Safety

There have been no reported instances that noxious weeds or past weed control efforts on the S-CNF, including the use of herbicides as referenced above, have affected worker health

and safety. Worker health and safety could potentially be affected if weed control methods are not properly conducted. Precautions, notifications, and other safeguarding measures described in Chapter 2 that will be followed by workers are intended to avoid or mitigate any potential hazards to their health and safety. Potential effects of the proposed project on worker health and safety are described in Chapter 4.

3.E.2. Indian Trust Assets/Treaty Rights

The federal government has federal trust responsibilities to Native American Tribes. At meetings with the Shoshone-Bannock Tribes regarding federal trust responsibilities, the major issues pertinent to the S-CNF have been:

- Protection of big game winter range, especially for elk, moose, bighorn sheep, deer, antelope, and mountain goat;
- Protection of small game and mammals;
- Protection of resident indigenous and anadromous fish habitat;
- Access to traditional plant resources, such as, but not limited to, bitterroot, choke cherry, elderberry, current, red-twig dogwood (red willow), and lodge pole pine collection areas; and
- Unrestricted access for hunting, fishing, and gathering.

Few if any actual Traditional Use sites have ever been documented through consultation with the Tribes, owing to privacy issues. These are sites historically used by Tribes for traditional land uses such as hunting, fishing, gathering, ceremonial, and religious practices for which the Federal government has trust responsibilities to the Tribes. Federal consultation, described in *Chapter 5, Consultation and Coordination,* of this document, is essential to ensure that the federal government's trust obligations to the Tribes are met.

3.E.3. Environmental Justice

Executive Order 12898, issued in 1994, ordered Federal Agencies to identify and address any adverse human health and environmental effects of agency programs that disproportionately impact minority and low-income populations. The Order also directs agencies to consider patterns of subsistence hunting and fishing when an agency action may affect fish or wildlife. While the alternatives may have differing impacts on wildlife and fish, as described in Chapter 4 none of the alternatives would alter opportunities for subsistence hunting and fishing by Native American Tribes. Tribes holding treaty rights for hunting and fishing on the S-CNF were consulted during scoping and during the preparation of this document, and also had an opportunity to comment on the Draft EIS.

3.E.4. Socioeconomic Resources

Generally, the current state of the S-CNF is in relatively good condition. Weeds exist but not necessarily as a result of increases in social and economic activity. However, there is evidence of weed control activities affected by changes in the social and economic structure outside the S-CNF boundaries. A changing social and economic environment can be partially responsible for the increase of invasive weeds on private land and on the S-CNF.

The changes are assumed to be the result of a decrease in agricultural land and increased subdivision development, including residential and business development (Quigley and Arbelbide 1997). Because land use has changed significantly as this development replaces farm or rangeland along the S-CNF boundaries, the expansion of use (private recreational and commercial) within the S-CNF is also likely (Hirsch and Leitch 1996).

a. Population and Economy

The S-CNF lies mostly in Lemhi, Custer, and Butte Counties. There are four population centers in the area: Salmon (pop. 3,122), Challis (pop. 909), Mackay (pop. 566), and Leadore (pop. 90). Other towns include Clayton and Stanley (http://www.census.gov/prod/cen2000/). These areas have been traditionally dependent on natural resource extractive-based industries. This includes economies based on recreation and tourism industries. Additionally, most local communities have shifted in recent times to a more diversified, service-based economy.

b. Lifestyle

Natural resource amenity values attract people to this region, even when employment opportunities are limited. Earnings are lower here, compared with other parts of the country, reflecting a "quality of life" premium that people are willing to pay to live in this region. Hunting, fishing, outdoor recreation, and mushroom and berry gathering are all amenities that are part of this quality of life premium. Invasive weeds affect that "premium" by changing views and natural habitats.

The lifestyle of the region is also closely tied to S-CNF lands and surrounding property. Traditional resource-based activities such as mining, livestock ranching, and logging play an important role in the culture and values of the region. Tourism is also playing an increasing role in the economy of the region. Differing values about public land and its use may affect the way the public views noxious weed control on the S-CNF and preferences for the alternatives being evaluated.

c. Economics

The cost of treating the current weed invasion in Idaho is roughly estimated at 300 million dollars annually (Idaho Department of Agriculture 2002b). On the S-CNF, spotted knapweed has infested nearly 64,000 acres and accounts for approximately 96 percent of the total weed infestations. The true cost, in loss of habitat, rangeland, wildlands, and water and soil quality on the S-CNF is unknown; as a result, the economic impact of the current weed invasion on the S-CNF cannot be fully defined. However, the adverse effects on wildlife habitat, forage for grazing, and water quality because of noxious weed invasions have been documented throughout the state of Idaho (Idaho Department of Agriculture 1999), and generally described in previous sections in discussions of noxious weed effects on various biological and physical resources.

Economic research in Montana documents the economic effect noxious weeds—particularly spotted knapweed—can have on a resource-based economy. Because Montana's economy and environment is similar to that of the areas around the S-CNF, a short review of the Montana study (adapted from the U.S. Forest Service Flathead National Forest Noxious and Invasive Weed Control Environmental Assessment, 2000a) is helpful.

Knapweed can displace native vegetation, reduce forage production, and diminish long-term rangeland productivity (Hirsch and Leitch 1996). Hirsch and Leitch (1996) estimate that invasive weeds cause an impact of $10.73 per infected rangeland acre (see also U.S. Forest Service, Flathead National Forest Noxious and Invasive Weed Control Environmental Assessment 2000a).

Hirsch and Lietch also estimate the loss of recreational opportunities at $3.95 per infested wildland acre (see also U.S. Forest Service, Flathead National Forest Environmental Assessment 2000a). Wildlife is important to many outdoor recreation activities, including consumptive activities such as hunting and fishing, and non-consumptive activities such as wildlife watching and photography. Consumptive recreation expenditures include the purchase of guns and ammunition, licenses, guides, fees, gas, lodging, food, and other goods and services. Non-consumptive recreation expenditures include items such as camping equipment and photography supplies. The economic impacts that result from knapweed-caused changes to wildlands are decreases in wildlife- and recreation-associated expenditures.

Increased need to treat sediment and other materials in municipal systems can lead to increased costs of treatment in communities bordering National Forest lands. Similarly, the resource-based economy of the communities that use the S-CNF—or rely on recreational and other economic opportunities available—can face adverse economic results from continued noxious weed invasions.

Additionally, wildlands have non-market or intangible benefits, such as healthy resilient ecosystems. It is difficult to place an economic value on the threat that weeds pose to broad or local ecosystems and their proper function. These non-market benefits accrue to individuals as consumer surplus, are very difficult to quantify, and have no monetary or economic value to use in a comparison of possible management actions (U.S. Forest Service 2000b). However, the intrinsic or inherent value of these wildlands has been acknowledged, and the loss of these wildlands is often assessed a "contingent" value.

3.F. Cultural Resources

Cultural resources are generally defined as the nonrenewable evidence of human occupation or activity (as evidenced through sites, buildings, structures, artifacts, ruins, objects, works of art, architecture, or natural features) that were important in human history at the state, local, or national level. The S-CNF has a long history of human use. The Lemhi Shoshone Tribe traditionally inhabited the valleys of the Lemhi River until their removal to the Fort Hall Reservation in 1907. Euro-American explorers first entered the area in 1805; trappers followed, with permanent settlements beginning in the mid to late 1800s. Currently, the remnants of all of these uses provide a unique cultural resource.

3.F.1. Native American Historic Resources and Religious Concerns

The U.S. Government and its agencies have a unique relationship with federally recognized American Indian Tribes. As federal agencies undertake activities that may affect a Tribe's rights, property interest, or trust resources, they carefully implement those activities in a manner that respects the Tribe's sovereignty and resource needs. The federal agencies have

trust obligations to address effects to Tribal interests, rights, and property on reservations, and must disclose known effects through this NEPA process.

The S-CNF includes the aboriginal territories of various bands of Shoshone-Bannock peoples. The Lemhi Shoshone were known occupants of the Lemhi area and resided on the Lemhi Reservation until they were removed and consolidated into the Shoshone-Bannock Tribes of the Fort Hall Reservation. The Shoshone-Bannock Tribes have aboriginal treaty rights within the S-CNF. The Shoshone-Bannock Tribes continue to hunt, fish, and gather on unoccupied Federal lands such as the S-CNF. The Shoshone-Bannock Tribal government encourages maintaining and restoring all lands to healthy ecosystems. Suggested management philosophies include removing cultural features that degrade the ecosystem and allow the ecosystem to recover naturally. The policy of the Shoshone-Bannock Tribes for management of the Snake and Salmon River Basin resources suggests drastic efforts to restore the ecosystem only when past uses have degraded the area's ability to recover. The least intrusive restoration efforts should be used. Weed control efforts would have direct and indirect effects on these Tribal policies, since the alternatives all include some manipulation of the existing S-CNF ecosystem but with an overall goal of ecosystem restoration.

Tribal information about hunting, fishing, gathering, and religious use is closely guarded by Tribal members. The S-CNF watersheds provide important habitat for culturally significant species like salmon as well as traditional hunting opportunities. The Tribes also have rights to gather various plant species that occur on the S-CNF. Noxious weeds can affect these plant populations and contribute to habitat degradation. Because weed control efforts may affect these areas and Tribal uses of the S-CNF, government-to-government consultation will be a continuing process.

The Shoshone-Bannock Tribes have areas of religious and cultural concern, cemeteries, burial areas, and ceremonial areas; these locations are also confidential information. The Tribes have ethnographic history that encompasses these areas and continues to be significant to the Tribes.

The Nee Mee Poo National Historic Trail crosses S-CNF land. It traces the route traveled by bands of Nez Perce people in 1877 as they were pursued by the U.S. Army. The Nez Perce Tribe currently manages the gray wolf reintroduction program, but the Tribe has claimed no present interest east of the Middle Fork of the Salmon River.

3.F.2. Other Cultural Resources

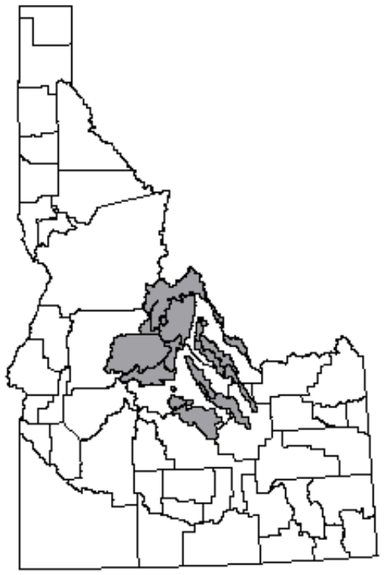
Identified cultural resources consist of prehistoric villages, camps, rock shelters, pictographs, vision quest sites, hunting blinds, sweat lodge features, stone rings, talus pits, trails, springs, and cambium peeled pine trees. Historic resources stem from the mining camps and ghost towns to homestead and ranch cabin ruins. Several sites in the S-CNF are known locations and camps of the Lewis and Clark Trail. S-CNF buildings, bridges, landing strips, and trails also have historical significance. These areas are all vulnerable to noxious weed expansion as the historical activities altered the original ecological setting.

In order to comply with the National Historic Preservation Act, S-CNF archaeologists and heritage program managers will monitor and review site-specific project activities to ensure compliance. The Idaho State Historic Preservation Office (SHPO) reviews all proposed

undertakings and maintenance activities taking place within the S-CNF. Weed control efforts may potentially affect these historic structures and cultural locations, but preferred methods will avoid an effect rather than mitigate it.

3.F.3. Paleontological Resources

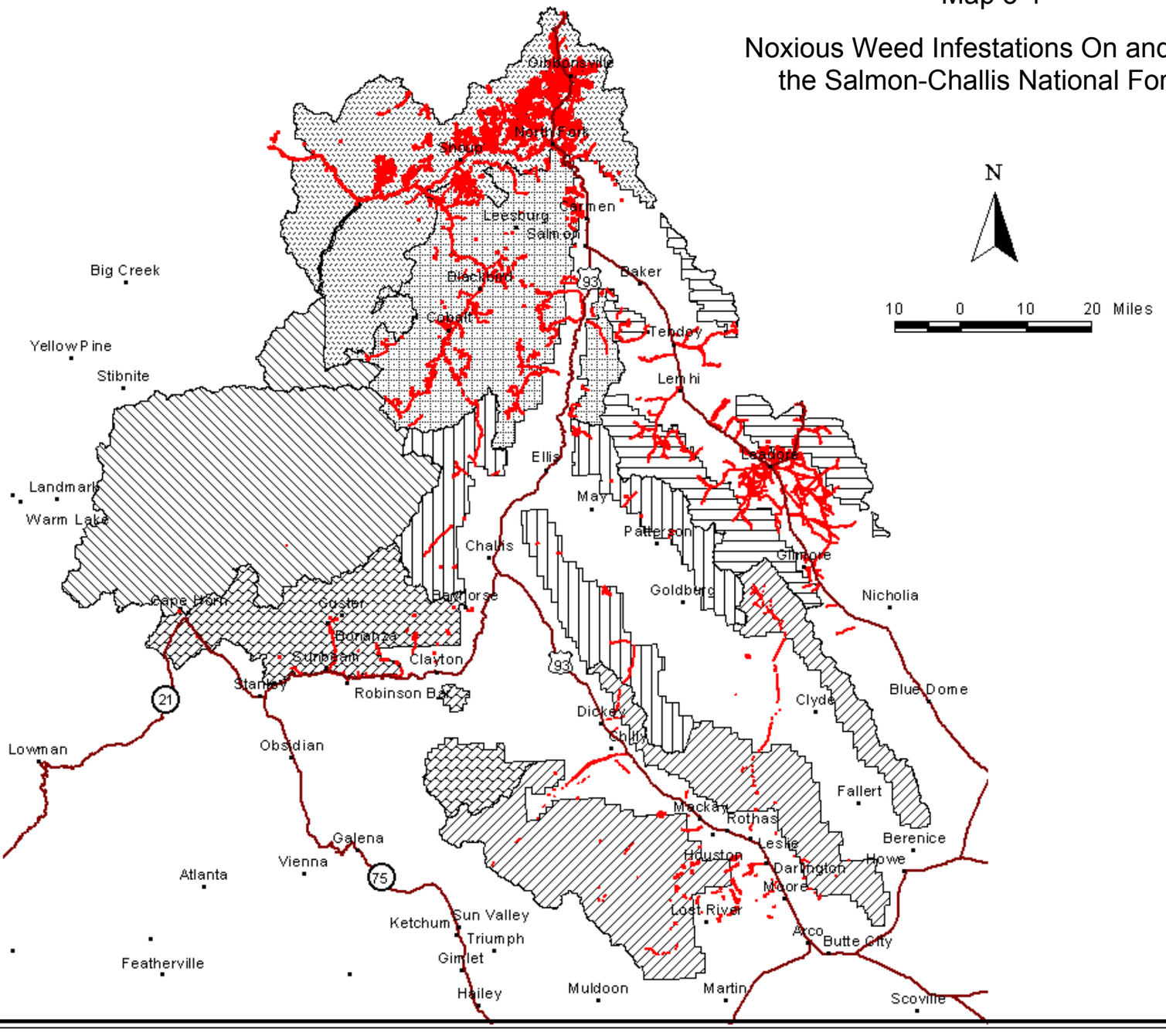
There are no known paleontological resources on the S-CNF, except for limited petrified wood locales. Presently available data suggest that the only significant paleontological sites are on nearby BLM, state, or private lands.



Location Map
Salmon-Challis National Forest

Map 3-1

Noxious Weed Infestations On and Near the Salmon-Challis National Forest

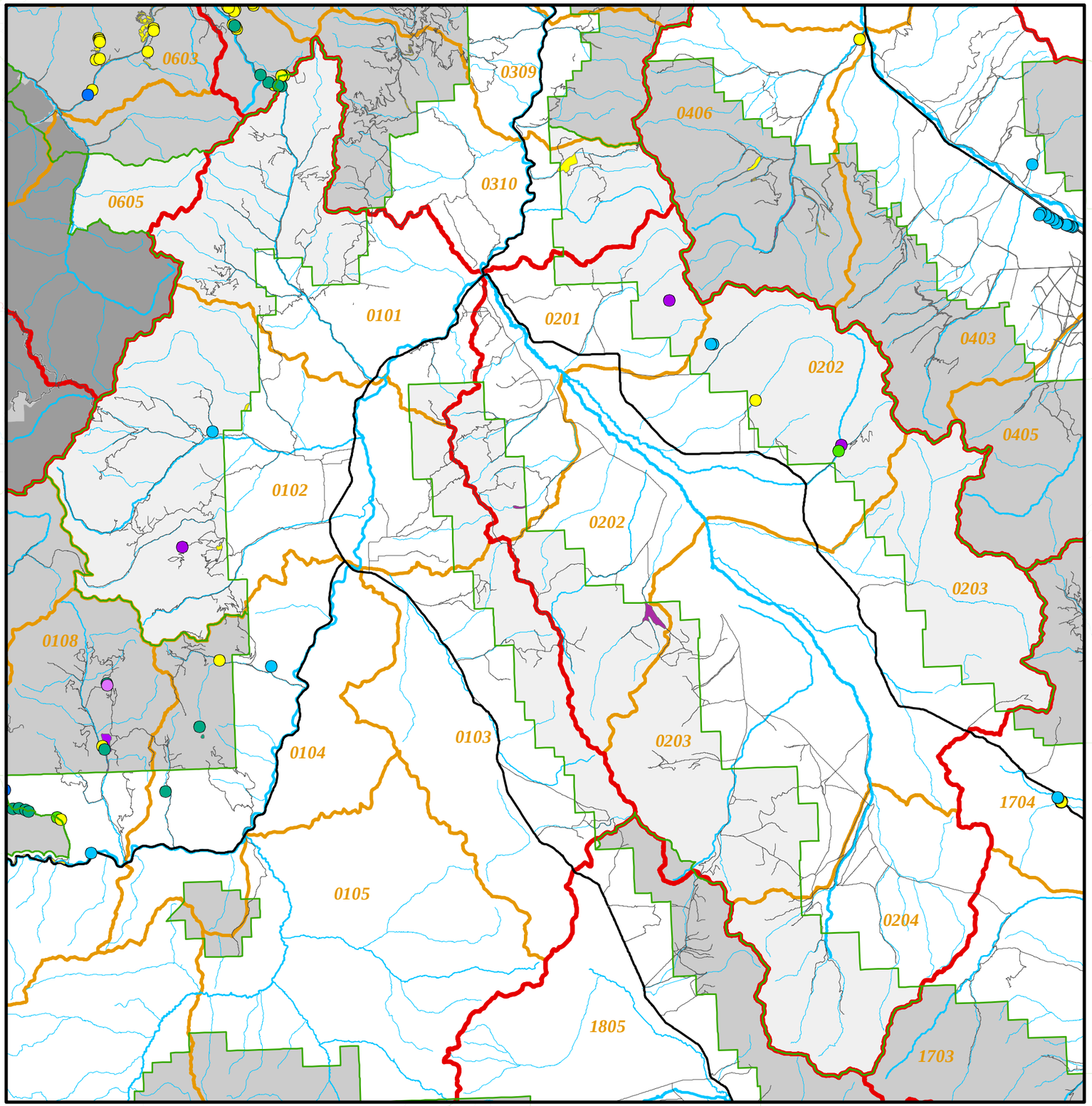


Map 3-2

Salmon-Challis National Forest
Challis Ranger District
Noxious Weed Locations

0 2 4 8 12 16
Miles

1:363,357



SPECIES

- Berteroa incana
- Canada thistle
- Dalmatian toadflax
- Other
- Russian knapweed
- St. Johnswort
- Black henbane
- Bull thistle
- Bur buttercup
- Common tansy
- Diffuse knapweed
- Dyer's woad
- Hoary alyssum
- Houndstongue
- Leafy spurge
- Musk thistle
- Rush skeletonweed
- Scotch thistle
- Spotted knapweed
- Sulphur cinquefoil
- Unknown
- Whitetop/Hoary cress
- Yellow toadflax

- Other Districts
- Challis District
- Wilderness Area
- Land Outside Salmon-Challis NF
- HUC 4 Watershed Boundaries
- HUC 5 Watershed Boundaries
- Roads
- Streams

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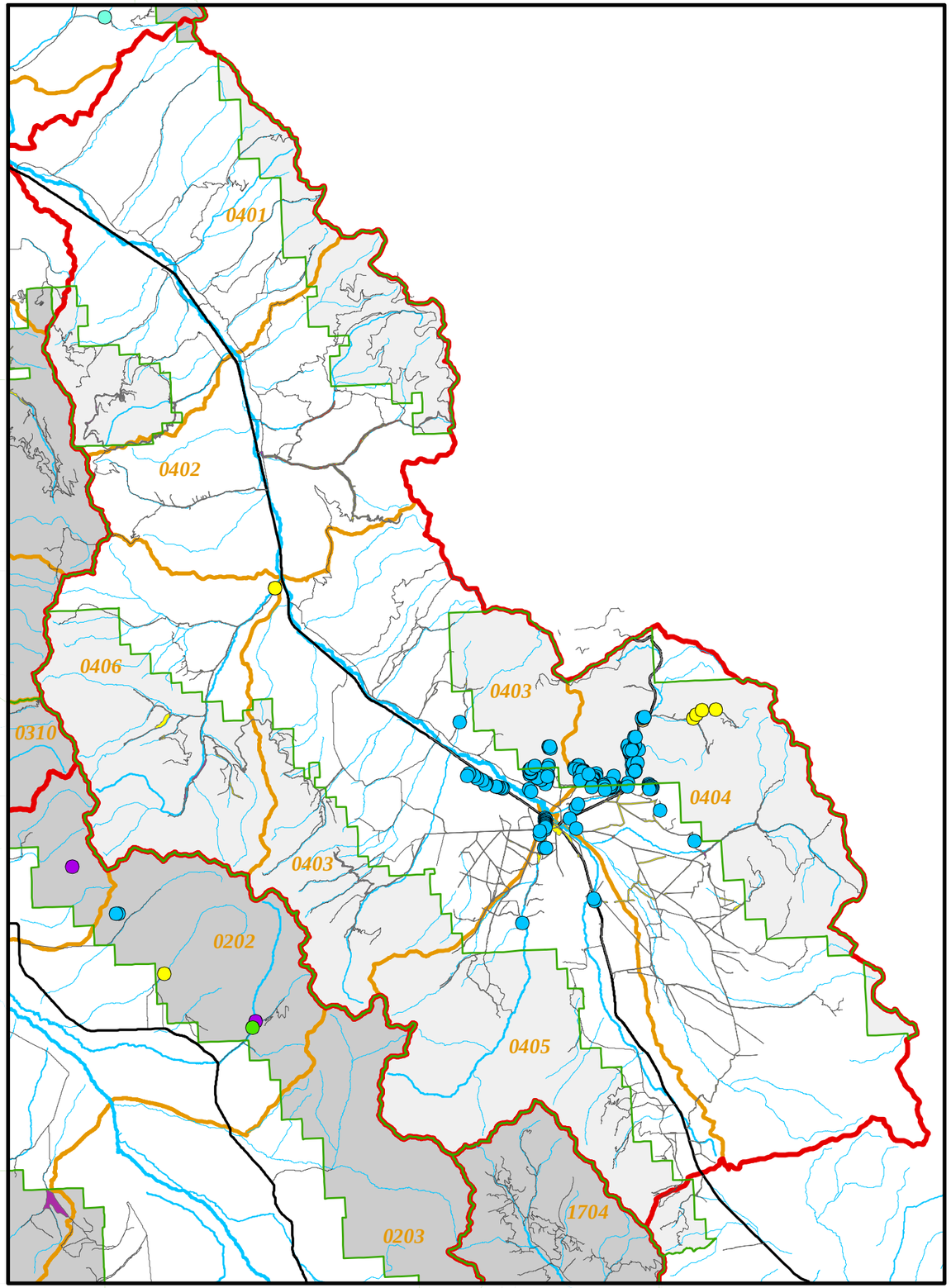
Map 3-3

Salmon-Challis National Forest
Leadore Ranger District
Noxious Weed Locations

0 2 4 8 12 16

Miles

1:394,953



SPECIES

- Berteroa incana
- Canada thistle
- Dalmatian toadflax
- Other
- Russian knapweed
- St. Johnswort
- Black henbane
- Bull thistle
- Bur buttercup
- Common tansy
- Diffuse knapweed
- Dyer's woad
- Hoary alyssum
- Houndstongue
- Leafy spurge
- Musk thistle
- Rush skeletonweed
- Scotch thistle
- Spotted knapweed
- Sulphur cinquefoil
- Unknown
- Whitetop/hoary cress
- Yellow toadflax

- Other Districts
- Leadore District
- Land Outside Salmon-Challis NF
- HUC 4 Watershed Boundaries
- HUC 5 Watershed Boundaries
- Roads
- Streams

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Map 3-4

Salmon-Challis National Forest Lost River Ranger District Noxious Weed Locations

0 1 2 4 6 8
Miles

1:434,349

SPECIES

- Berteroa incana
- Canada thistle
- Dalmatian toadflax
- Other
- Russian knapweed
- St. johnswort
- black henbane
- bull thistle
- bur buttercup
- common tansy
- diffuse knapweed
- dyer's woad
- hoary alyssum
- houndstongue
- leafy spurge
- musk thistle
- rush skeletonweed
- scotch thistle
- spotted knapwed
- sulphur cinquefoil
- unknown
- whitetop/hoary cress
- yellow toadflax

- Other Districts
- Lost River District
- Land Outside Salmon-Challis NF
- HUC 4 Watershed Boundaries
- HUC 5 Watershed Boundaries
- Roads
- Streams

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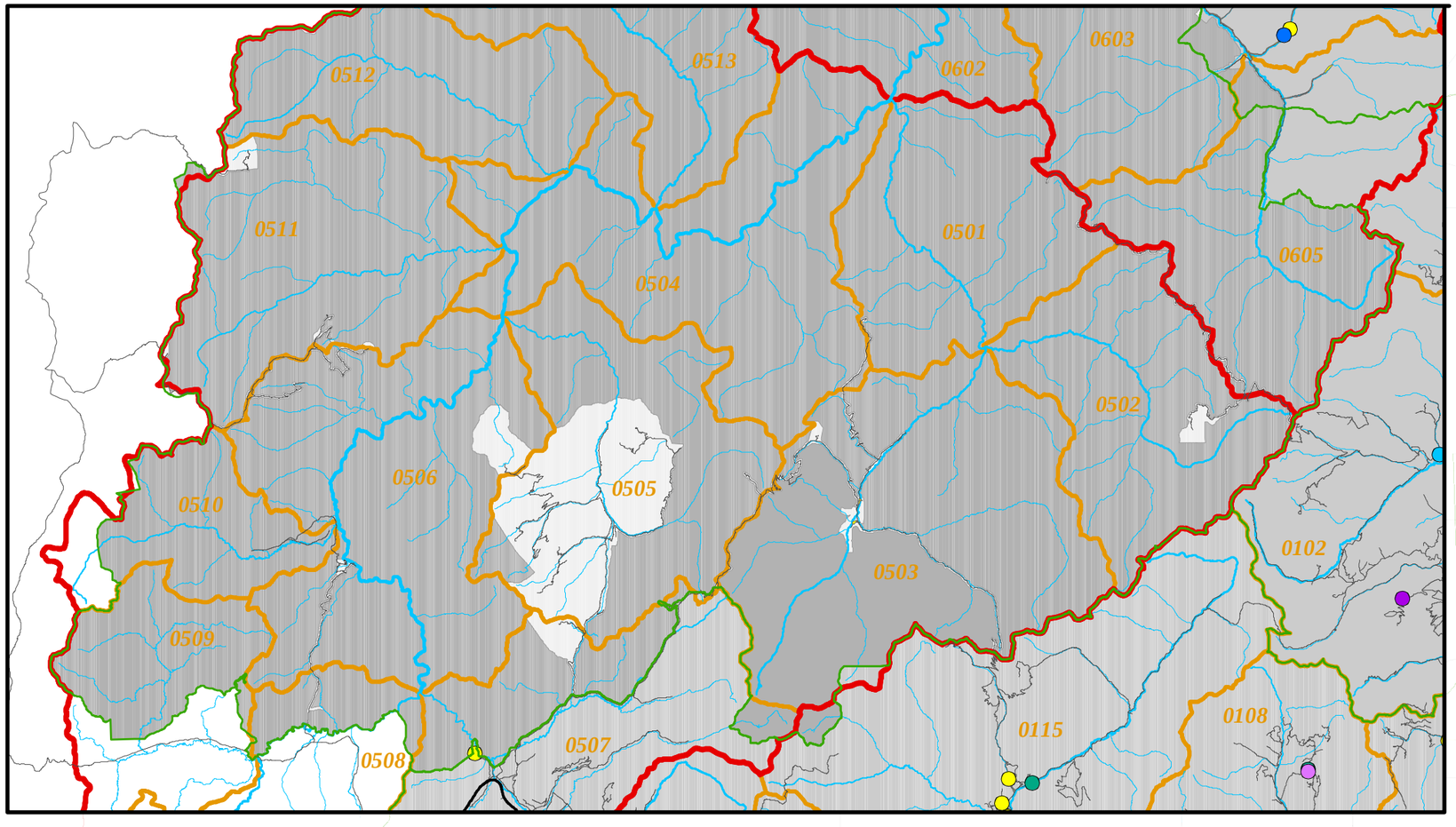
Map 3-5

Salmon-Challis National Forest
Middle Fork Ranger District
Noxious Weed Locations

0 2 4 8 12 16

Miles

1:363,357



SPECIES

- Berteroa incana
- Canada thistle
- Dalmatian toadflax
- Other
- Russian knapweed
- St. Johnswort
- Black henbane
- Bull thistle
- Bur buttercup
- Common tansy
- Diffuse knapweed
- Dyer's woad
- Hoary alyssum
- Houndstongue
- Leafy spurge
- Musk thistle
- Rush skeletonweed
- Scotch thistle
- Spotted knapweed
- Sulphur cinquefoil
- Unknown
- Whitetop/Hoary cress
- Yellow toadflax

- Other Districts
- Middle Fork District
- Wilderness Area
- Land Outside Salmon-Challis NF
- HUC 4 Watershed Boundaries
- HUC 5 Watershed Boundaries
- Roads
- Streams

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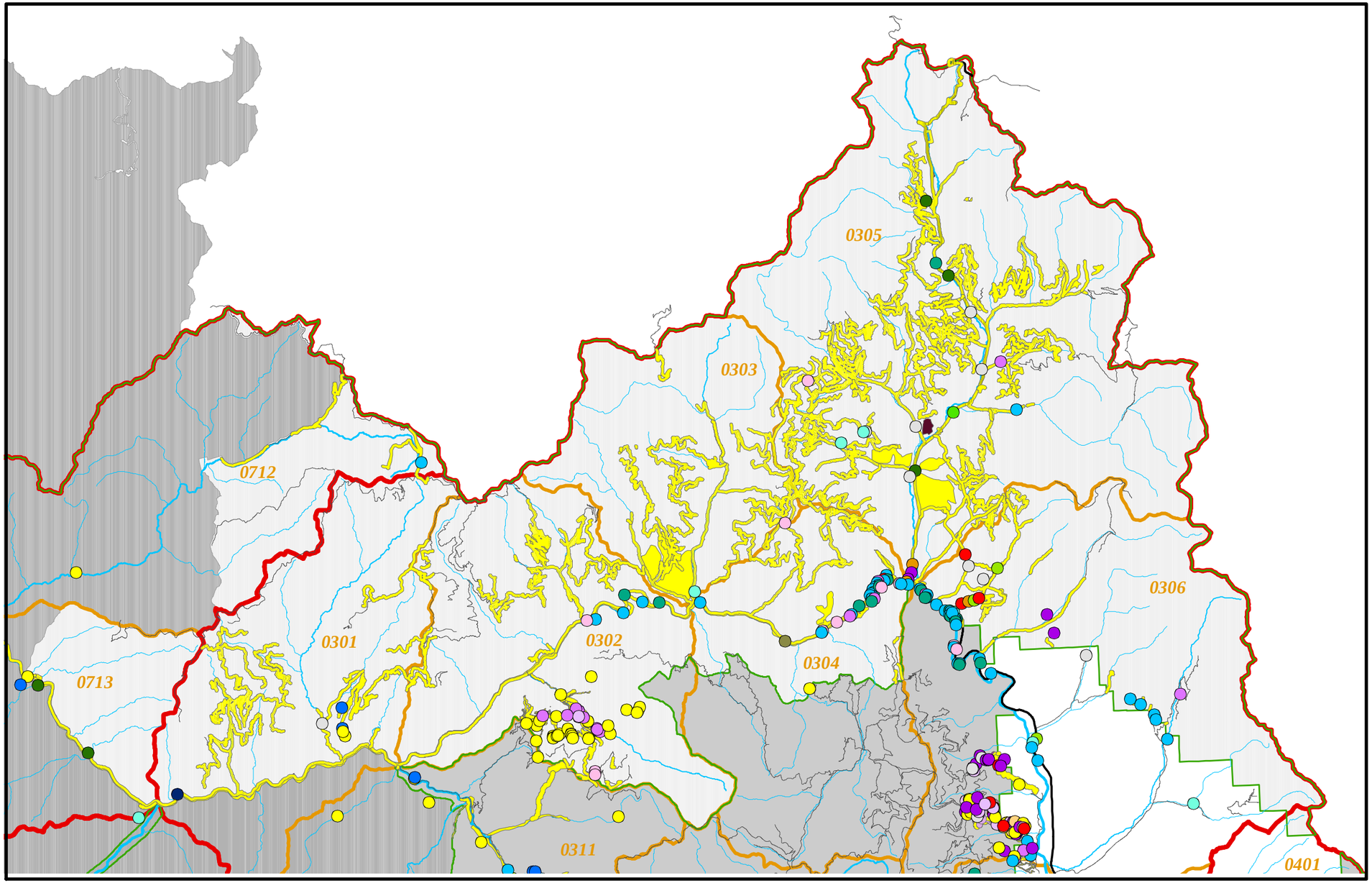
Map 3-6

Salmon-Challis National Forest
North Fork Ranger District
Noxious Weed Locations

0 1.25 2.5 5 7.5 10

Miles

1:263,957



SPECIES

- Berteroa incana
- Canada thistle
- Dalmatian toadflax
- Other
- Russian knapweed
- St. Johnswort
- Black henbane
- Bull thistle
- Bur buttercup
- Common tansy
- Diffuse knapweed
- Dyer's woad
- Hoary alyssum
- Houndstongue
- Leafy spurge
- Musk thistle
- Rush skeletonweed
- Scotch thistle
- Spotted knapweed
- Sulphur cinquefoil
- Unknown
- Whitetop/Hoary cress
- Yellow toadflax

- Other Districts
- North Fork District
- Wilderness Area
- Land Outside Salmon-Challis NF
- HUC 4 Watershed Boundaries
- HUC 5 Watershed Boundaries
- Roads
- Streams

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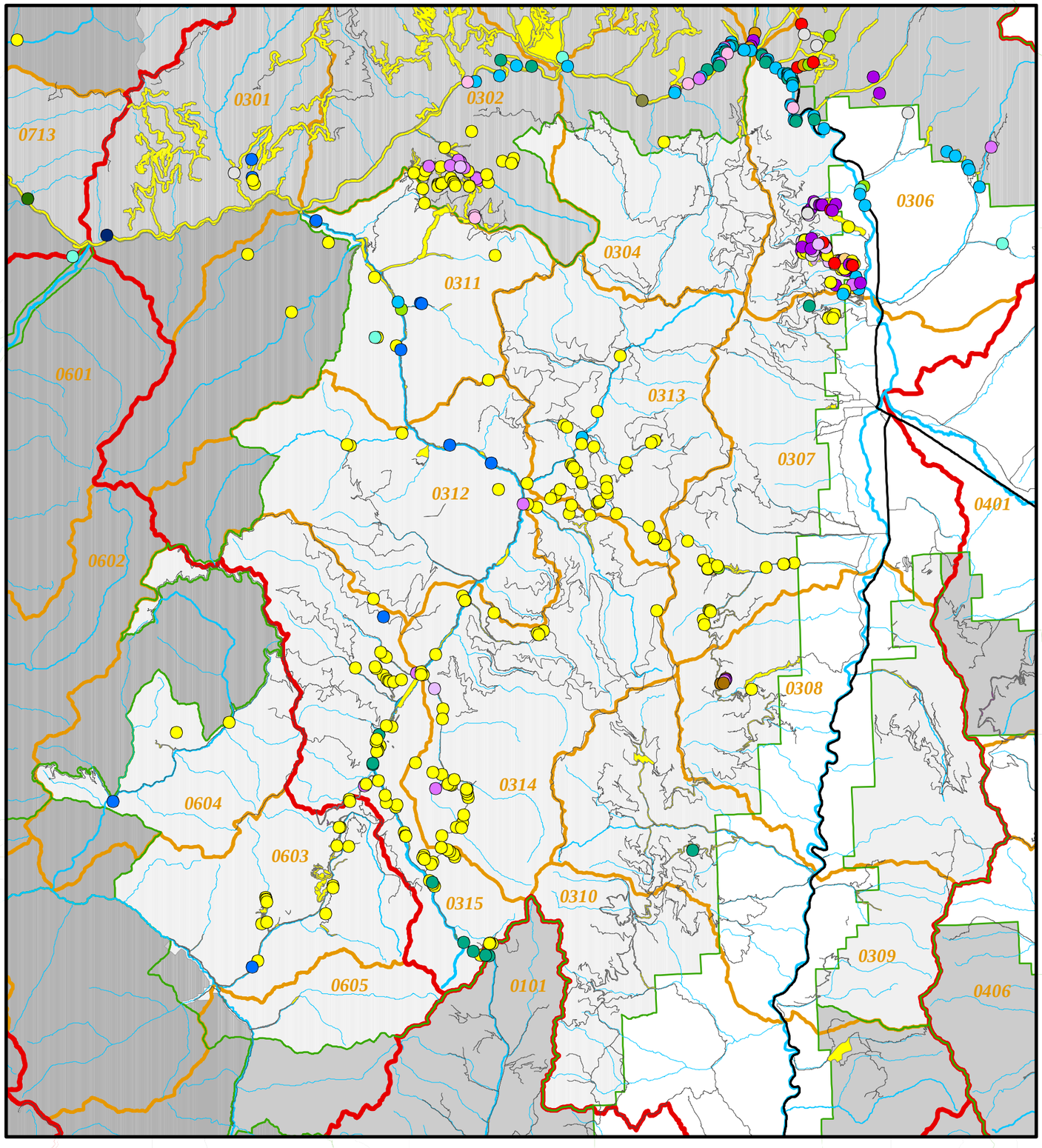
Map 3-7

Salmon-Challis National Forest
Salmon-Cobalt Ranger District
Noxious Weed Locations

0 1.5 3 6 9 12

Miles

1:308,557



SPECIES

- Berteroa incana
- Canada thistle
- Dalmatian toadflax
- Other
- Russian knapweed
- St. Johnswort
- Black henbane
- Bull thistle
- Bur buttercup
- Common tansy
- Diffuse knapweed
- Dyer's woad
- Hoary alyssum
- Houndstongue
- Leafy spurge
- Musk thistle
- Rush skeletonweed
- Scotch thistle
- Spotted knapweed
- Sulphur cinquefoil
- Unknown
- Whitetop/Hoary cress
- Yellow toadflax

- Other Districts
- Salmon-Cobalt District
- Wilderness Area
- Land Outside Salmon-Challis NF
- HUC 4 Watershed Boundaries
- HUC 5 Watershed Boundaries
- Roads
- Streams

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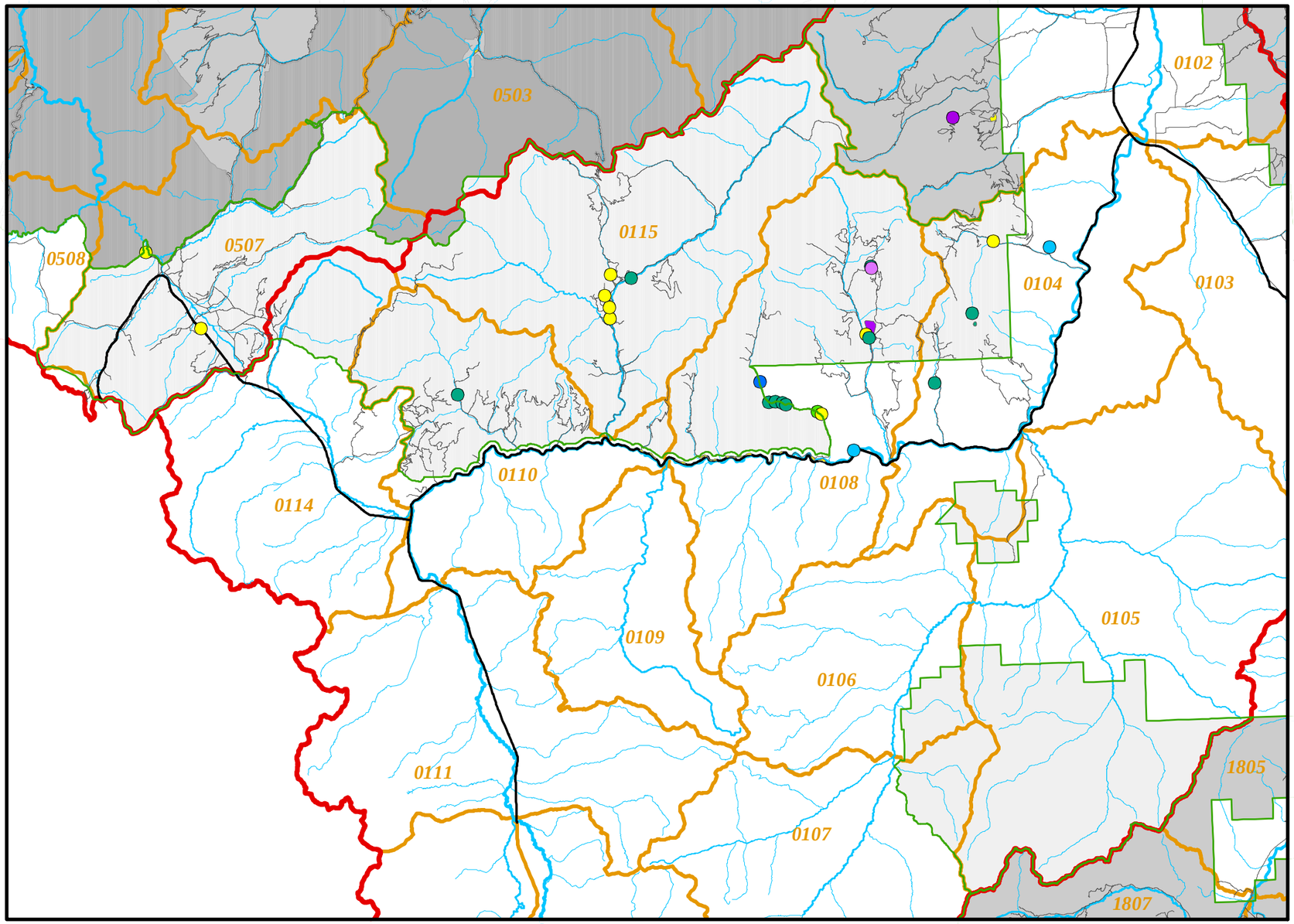
Map 3-8

Salmon-Challis National Forest
Yankee Fork Ranger District
Noxious Weed Locations

0 2 4 8 12 16

Miles

1:363,357



SPECIES

- Berteroa incana
- Canada thistle
- Dalmatian toadflax
- Other
- Russian knapweed
- St. Johnswort
- Black henbane
- Bull thistle
- Bur buttercup
- Common tansy
- Diffuse knapweed
- Dyer's woad
- Hoary alyssum
- Houndstongue
- Leafy spurge
- Musk thistle
- Rush skeletonweed
- Scotch thistle
- Spotted knapweed
- Sulphur cinquefoil
- Unknown
- Whitetop/Hoary cress
- Yellow toadflax

- Other Districts
- Yankee Fork District
- Wilderness Area
- Land Outside Salmon-Challis NF
- HUC 4 Watershed Boundaries
- HUC 5 Watershed Boundaries
- Roads
- Streams

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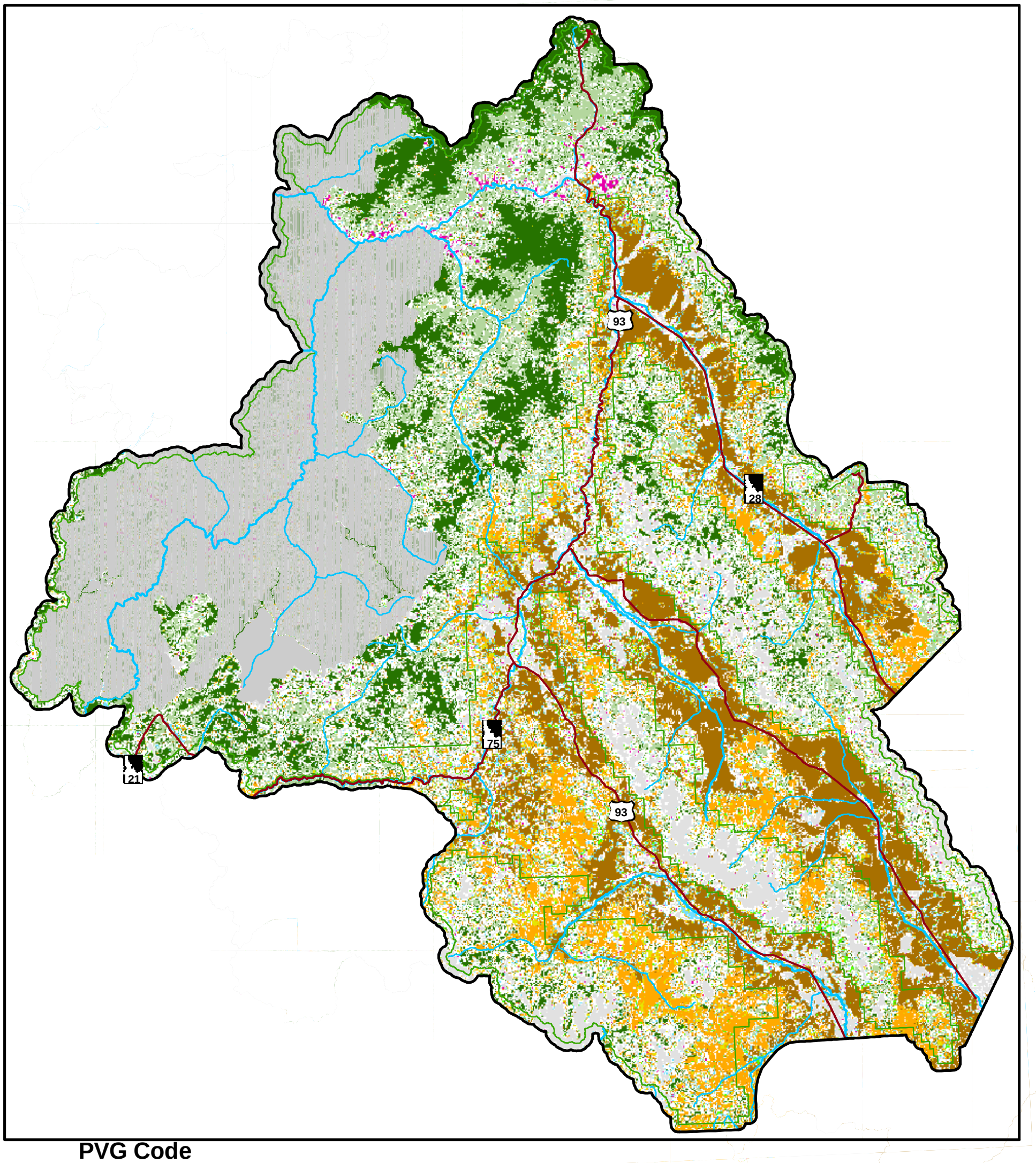

PVG Code

- 1 - Cool Shrub
- 2 - Dry Forest - Douglas Fir
- 3 - Dry Forest - Ponderosa Pine
- 4 - Dry Grass
- 5 - Dry Shrub
- 6 - Cold Forest
- 7 - Riparian
- 8 - Woodland
- 9 - Not Applicable

0 5 10 20 30 40

Miles

1:870,387

Map 3-9

Salmon-Challis National Forest
PVG

W082003003BOI

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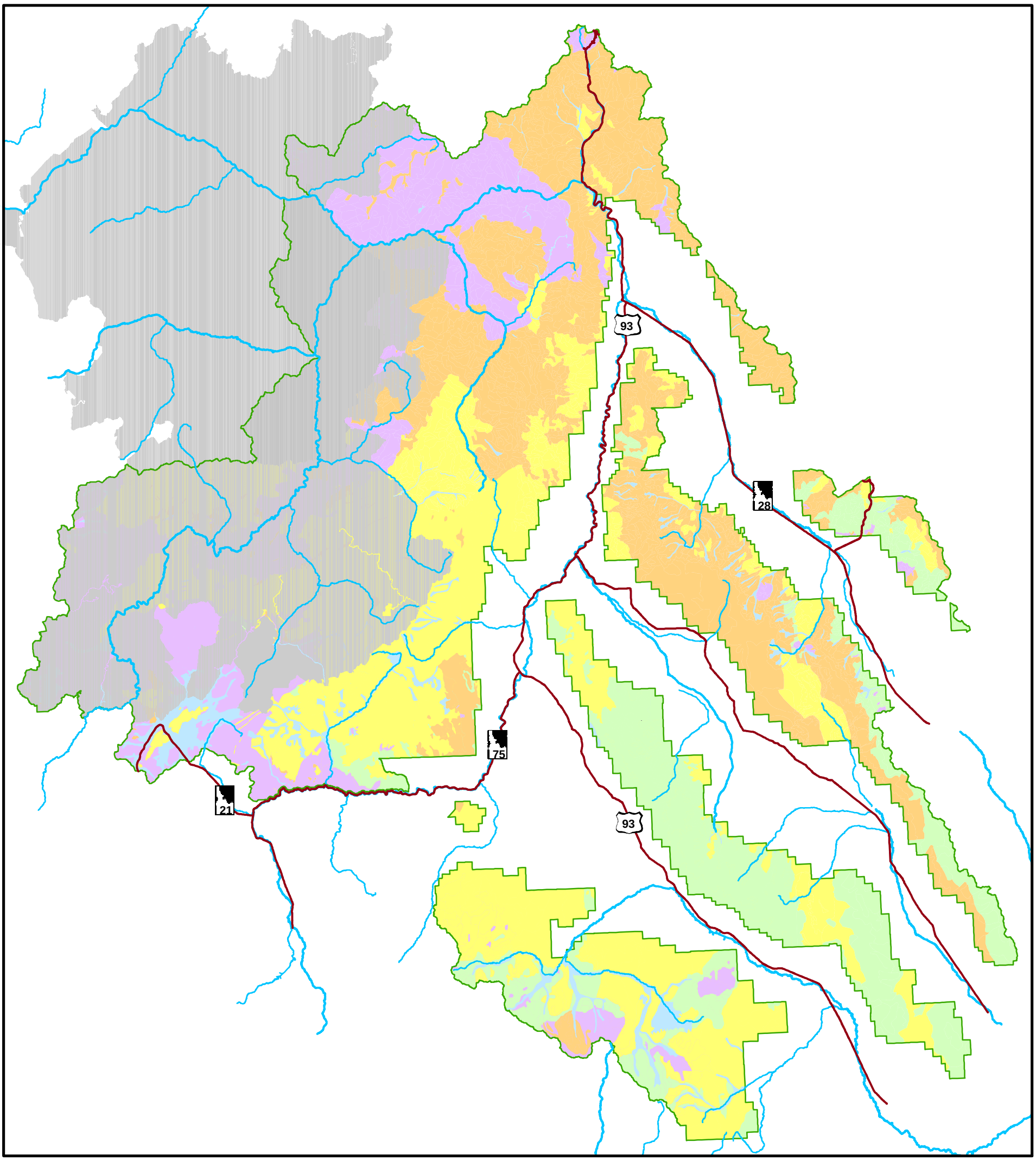


GEOLOGY

- Alluvium
- Granitic
- Mixed
- Quartzite
- Sedimentary
- Volcanic
- Wilderness

0 5 10 20 30 40

Miles

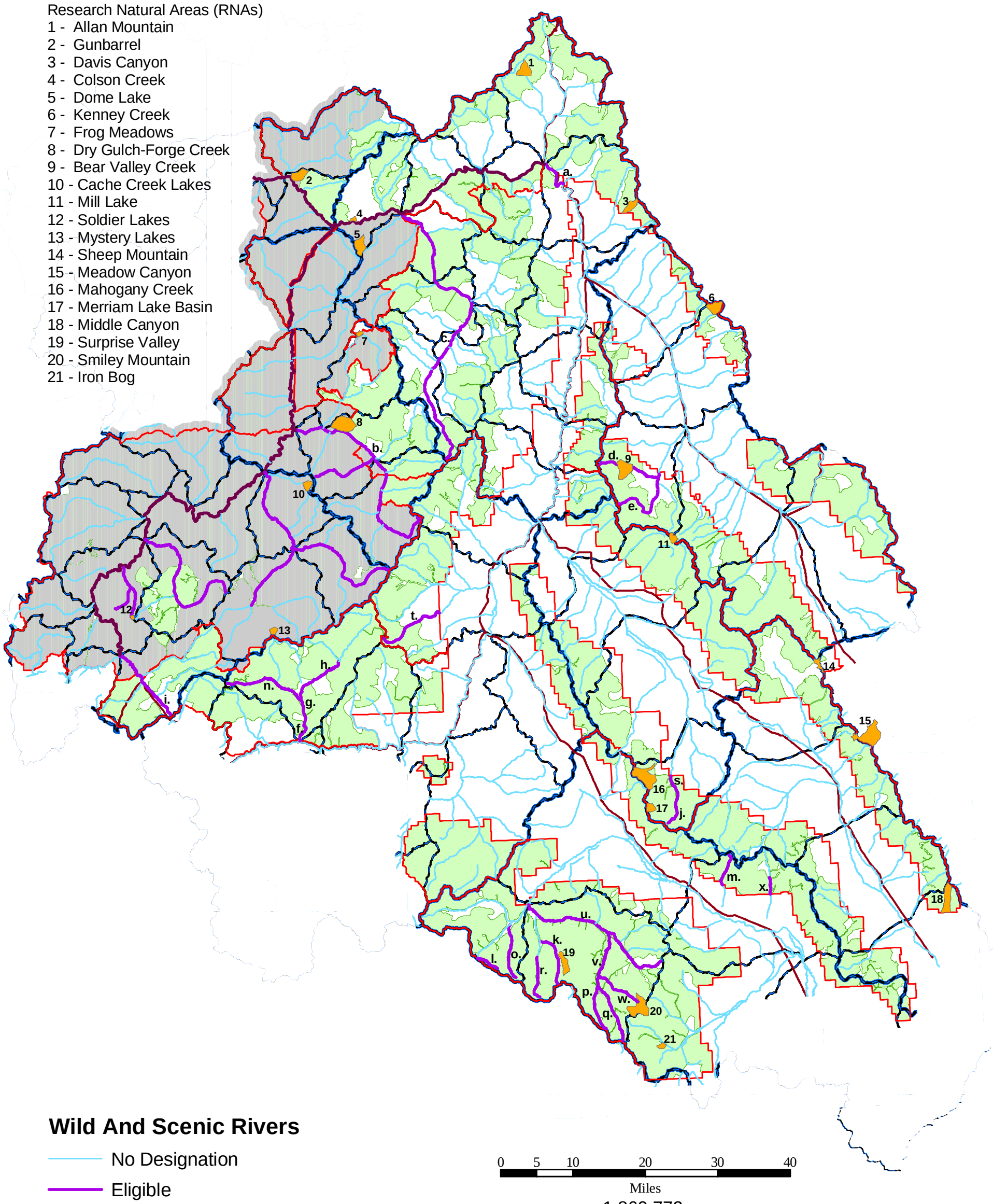
1:869,986

Map 3-10

Salmon-Challis National Forest Geology

Research Natural Areas (RNAs)

1 - Allan Mountain
2 - Gunbarrel
3 - Davis Canyon
4 - Colson Creek
5 - Dome Lake
6 - Kenney Creek
7 - Frog Meadows
8 - Dry Gulch-Forge Creek
9 - Bear Valley Creek
10 - Cache Creek Lakes
11 - Mill Lake
12 - Soldier Lakes
13 - Mystery Lakes
14 - Sheep Mountain
15 - Meadow Canyon
16 - Mahogany Creek
17 - Merriam Lake Basin
18 - Middle Canyon
19 - Surprise Valley
20 - Smiley Mountain
21 - Iron Bog



0 5 10 20 30 40

Miles

1:869,772

Wild And Scenic Rivers

- No Designation
- Eligible
- Designated
- RNA
- Roadless Area
- District Boundaries
- HUC 5 Boundaries
- HUC 4 Boundaries
- Highways
- Wilderness Area

Map 3-11

Salmon-Challis National Forest
Special Land Use Designations